

*June 1937*

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



# technology review

Published by MIT

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reads...  
They Satisfy*



*And there's a wealth of  
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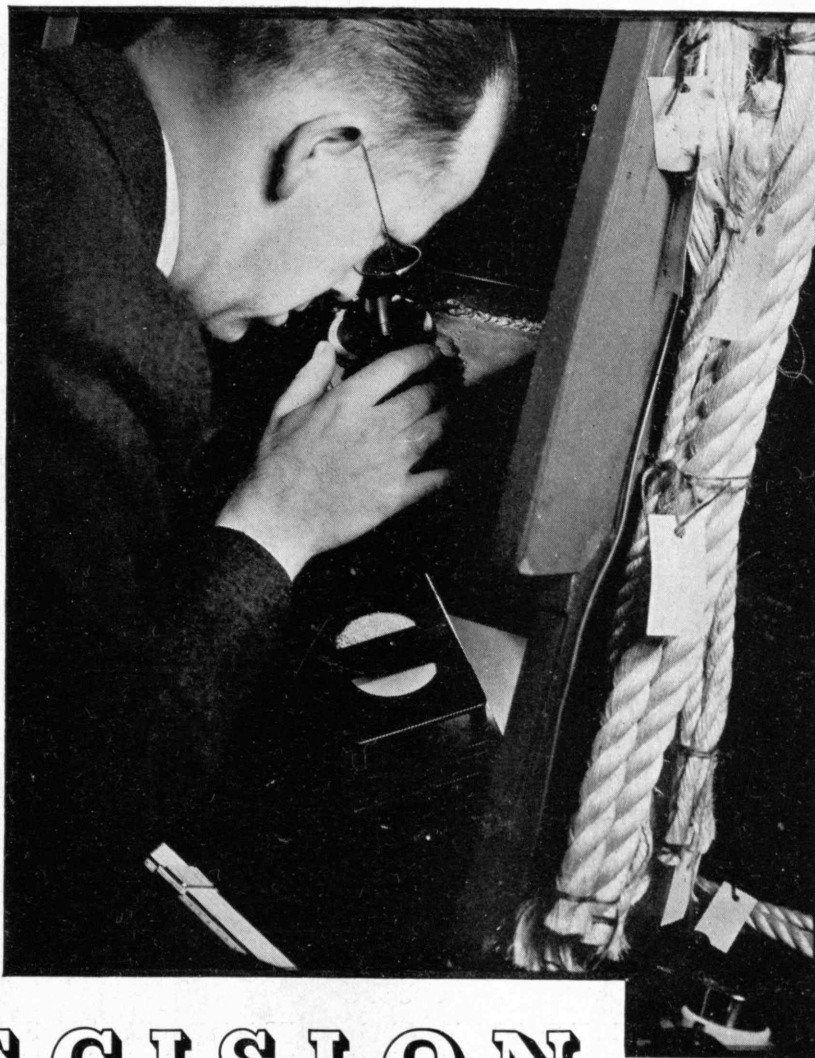


Photo by Anton Bruehl

# PRECISION

Powerful lenses . . . a beam of light . . . an electric recorder of infinite precision, measuring minute color variations in Manila fibers . . . Here, in the laboratory of the Plymouth Cordage Company, science is at work, checking the fiber examination—supplementing the judgment of those experts who first examine and qualify all raw fiber entering the plant.

This is but one of the many searching tests which control the quality and uniformity of Plymouth Ship Brand Manila Rope . . . In ceaseless vigilance, our laboratory men share with Plymouth ropemakers the responsibilities of manufacturing "The Rope You Can Trust" . . . the rope in which industrial users have expressed confidence for over a century.

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Sales Branches: New York, Boston, Baltimore, Philadelphia, Cleveland, Chicago, New Orleans, San Francisco





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Tough—free machining in that metal chips break ahead of the tool and do not tear out—makes an excellent wearing surface—takes a high finish like steel—is dense and close grained—fully perlitic and contains no free ferrite—can be heat treated and hardened up to 500 Brinnell—these characteristics make it applicable in many cases where steel has been formerly used

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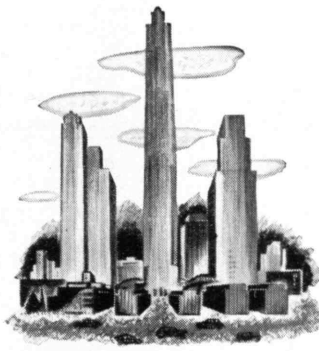


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ELECTRIC ELEVATOR COMPANY

CONSULT WESTINGHOUSE  
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## AWARD *to* QUALITY

All remember the long, lean years happily behind us now, when only the most laborious and constant inspection and repair kept electric circuits in working order. During those times, quality products were truly appreciated.

Now a new day is here. Industry shows every indication of sound recovery. In anticipation of this revival, The Okonite Company has continuously conducted intensive laboratory research and field studies. The results are some new types of cable to meet newly developed trends. This means for every class of work in every branch of industry; steel, electric power, railroads, mining, marine, and industrial plants of all kinds.

With the resumption of electric plant construction and expansion, only the best of wires and cables will be used. And because of its proven performance, Okonite insulation takes its place in the front rank of quality products.

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Founded 1878



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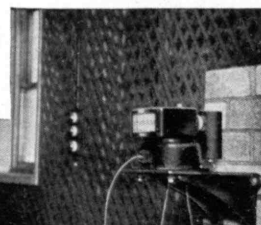
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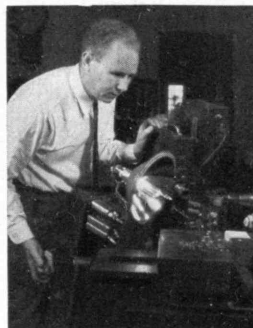
The Cambridge Illuminated Dial Fluxmeter is particularly suitable for routine testing of magnets. On this model figures engraved upon a transparent moving scale

are projected by means of an illuminating optical system onto a translucent screen. The resulting magnification provides an equivalent scale length of twenty inches; with end, center or displaced zero. Useful not only in badly lighted places but also for distant readings in ordinary daylight. A Bowden wire controls the zeroizing device at a distance. If required, portions of the screen can be colored green and red for test acceptance or rejection limits. It is readily used by unskilled workmen.

**CAMBRIDGE  
INSTRUMENT CO INC**

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## THE TABULAR VIEW



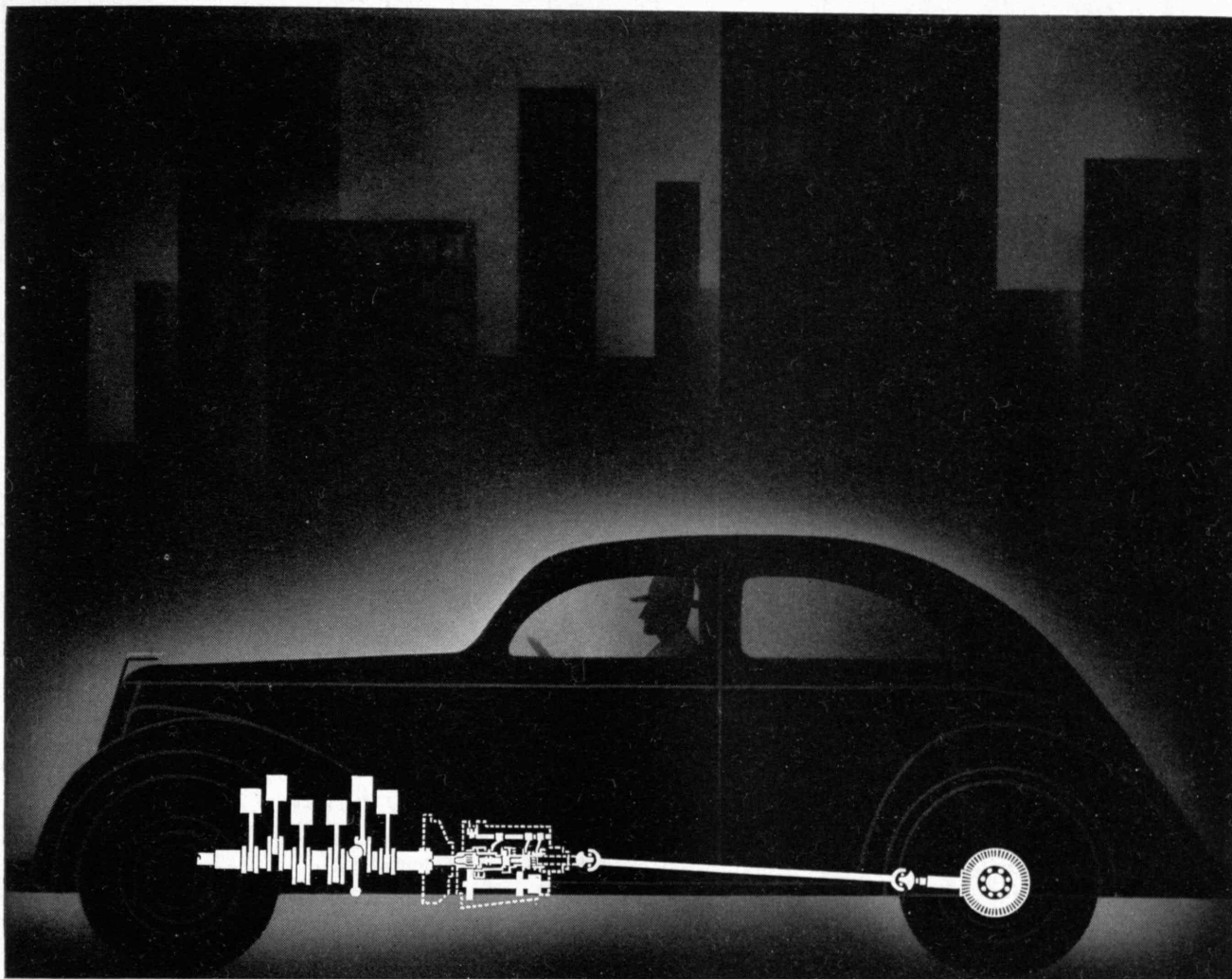
WE of The Review amuse ourselves, come a rainy Sunday morning, by working out journalistic analogies of scientific devices and laws. While we haven't yet rounded out our analogue of the differential analyzer or of the "families of asymptotic cosmic-ray paths projected on the meridian plane" described on page 334, we have, as you may have observed in the March issue,

neatly turned the stereoscope into an instrument of journalism by pointing out, politely or no, that The Review strives to present Science's new world picture in the startling clarity of relief.

And now we have codified another set of editorial principles, gathering them like electrons about a nucleus of analogy. It is the *stroboscope* this time. As readers well know, this instrument enables our eyes to see fast-moving phenomena that unaided eyes cannot see. The Review seeks to be a journalistic stroboscope for helping the intelligent layman to see, to analyze, and to understand the rapid-moving progress of science and technology. As it plays its stroboscopic light on scientists and engineers at work, it not only seeks to illuminate what they do; it reveals and permanently records, in hundreds of pictures, the startling, the strange, or beautiful things that are found in the sub-visual world of science or the ab-visual world of engineering.

THIS month the stroboscopic light plays on such fast-moving scientific activities as television (325), cosmic-ray research (333), biological engineering (346), atomic architecture (338), the efforts to make a day-light-producing lamp (327), avoiding selenium poisoning (328), charting the migrations of modern man (331), handling patents in an educational institution (348) — and many others that cover-to-cover readers will discover for themselves. ¶ Behind the by-lines affixed to a few of these articles are these credentials: PHILIP M. MORSE, Associate Professor of Physics, is the author of a recent book, "Vibration and Sound." This month he is to deliver the Sigma Xi lecture at Case School of Applied Science, his Alma Mater. ¶ M. J. BUEGER, '24, Associate Professor of Mineralogy and Petrography at the Institute and authority on crystallography, joins the MacMillan expedition to Baffin Island this summer as chief mineralogist and geologist. His collaborator, J. S. LUKESH, '36, is a graduate student majoring in crystallography at Technology. ¶ FLORENCE W. STILES, '22, a graduate of the School of Architecture, is now its librarian and is president of the M.I.T. Women's Association. ¶ Professor J. W. M. BUNKER is director of the Institute's research laboratories of biology. A report on some of his latest work as a researcher is given on page 352.





## The "backbone" of the modern automobile

To the automotive industry's everlasting credit it can be said that it has never relaxed in striving to make motor cars still safer, still more efficient, and of still greater dollar-for-dollar value. "Make it tougher, stronger, longer lasting," is the relentless self-imposed command. And, though the limits often seem to have been reached, engineering and metallurgical science usually manages to raise the standard another notch.

Molybdenum and Climax's years of field and laboratory investigations have contributed notably

to this progress. Through improved steel-alloy analyses, the "backbone" of the modern automobile has attained a reach toward perfection undreamed of a decade ago.

"Moly" steels are going into crankshafts, connecting rods, steering arms and knuckles, transmission gears, propeller shafts, universals, ring-gears and pinions, rear axle shafts. . . . Not only making them better parts, but cutting production costs through improved heat-treating, forging, carburizing and machining.

*Engineering and production heads are invited to send for our technical book, "Molybdenum." Our accumulation of data and the facilities of our laboratory are available to any concern interested in "Moly" toward solving difficult ferrous problems. Climax Molybdenum Company, 500 Fifth Avenue, New York City.*

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**Modern Design -  
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**BS** Ask for catalog. Brown & Sharpe  
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TOOLS**




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Herbert G. Pratt, '85, Pres. and Treas.  
Mills at Shirley, Mass., Anniston, Ala.,  
and Icard, N. C.

Manufacturers of braided cords of all kinds, including sash cord, clothes line, trolley cord, signal cord, arc lamp cord, shade cord, Venetian blind cord, awning line, and cord for many other purposes, also cotton twines.

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Our extra quality, distinguished at a glance by our trade mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than forty years.

## MAIL RETURNS

PICTURES AND LETTERS FROM REVIEW READERS

### *This Month's Mailbag*

IN commenting on the photograph reproduced on the cover of the April issue we pointed out the distortion that appears in photographs (or their reproductions) if they are not viewed from the correct distance. In making this observation we dropped our guard, it seems, and Mr. Benjamin Ginsburg of Richmond Hill, N. Y., stepped in with a wallop (page 318) directed at the way *The Review*, and, we take it, every other magazine, reproduces photographs. ¶ Last month we started what we hope to be a regular practice — the reproduction in this column of interesting photographs from readers. Three such photographs embellish "Mail Returns" this issue (pages 316, 318, and 320). ¶ Fencing is a sport — a gentleman's game — in which Americans are showing increased proficiency. A shining example is Joseph L. Levis, '26, national foils champion, and we are sure he would ardently agree with the letter of Rear Admiral R. E. Bakenhus, '96 (page 320). The thought behind this call to foils and other arms of the fencing art is that Technology students have a unique opportunity to excel in this sport.

HERE, first of all, is a letter that tells us that the writer likes *The Review* — only that and nothing more. But what a joy it is to pick up an occasional letter from one of the men on location who merely wants to go on record as does Enoch F. Greene, Jr., '30, of Miami, Ariz. His letter: "... I have received every ... number of *The Review* for this year ... and I do derive much pleasure, as well as benefit (it seems to me) from *The Review*. You well appreciate that there are to be found in it articles and features of a kind that one would find in no other periodical in the world. ..."

FROM ROBERT W. HUNN, '28:



The ice formation on the wheel after running over ice slushy roads seemed so unique that I had to record it. The picture may be of interest to persons more scientifically minded than I am. ...  
Louisville, Ky.

(Continued on page 318)



# PHELPS DODGE

## COPPER PRODUCTS CORPORATION

Subsidiary of Phelps Dodge Corporation



Specializing in the manufacture and sale of products made from copper mined by Phelps Dodge Corporation, and operating the following fabricating units.



### AMERICAN COPPER PRODUCTS DIVISION

manufacturers of copper rods, wire, strip, bus bars and special shapes, strand, trolley wires, brass and bronze wire and strip, weatherproof wire and P.D.C.P. hollow cables.

### BRITISH AMERICAN TUBE DIVISION

manufacturers of "Bulldog" condenser and heat exchanger tubes, brass, bronze and copper tubes, copper and brass pipe, copper water tubes, brass and bronze rods, and extruded shapes.

### HABIRSHAW CABLE & WIRE DIVISION

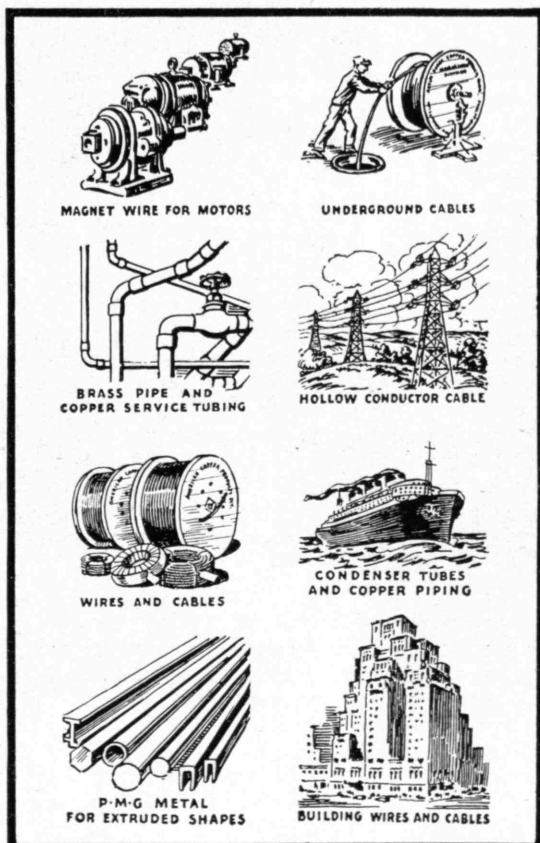
manufacturers of paper and varnished cambric insulated power cables; oil-filled and pressure cables; telephone, telegraph and signal wires; rubber and lead covered cables; also, Habirshaw "Flame Stop" Safecote rubber covered wires and cables — the quality product — for building uses.

### INCA MANUFACTURING DIVISION

manufacturers of enameled copper wire, enameled fabric covered copper wire, single and double cotton or silk covered copper wire, single and double cotton or paper covered rectangular and square copper wire and coils.

### P-M-G METAL DIVISION

manufacturers of copper alloy products, having special corrosion resistance and high physical qualities; rods, bars, wire, tubing and fittings, strip, sheet, rigid conduit, electric metallic tubing, sand castings and forgings.



General Sales Offices: 40 WALL STREET, NEW YORK, N. Y.

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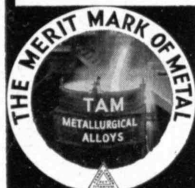
BAYWAY, N. J.

YONKERS, N. Y.

FORT WAYNE, IND.

LOS ANGELES, CAL.

... in the search for  
**QUALITY IMPROVEMENT**  
**TAMCO lends a hand**



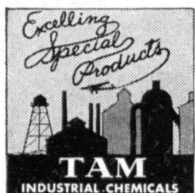
**METALLURGICAL DIVISION**

TAMCO has pioneered development of uses for Titanium and Zirconium since 1906 and the metallurgical field is reaping a harvest of this development in its acceptance and use of TAM Original High Carbon F. C. T. (Ferro Carbon Titanium), TAM Medium Carbon F. C. T., TAM Ferro Titaniums and many other TAM Metallurgical Alloys and materials for the production of high quality metals, both ferrous and non-ferrous.



**CERAMIC DIVISION**

It has been largely through TAMCO Research and practical endeavor that Zirconium opacifiers are today replacing the more costly tin oxide in porcelain enamels and glazes, and yielding equal, if not superior results. TAM Ceramic Products include TAM Opax and TAM Hy-Opax, TAM Treopax (Zirconium opacifiers), TAM Zircopax, TAM Enameling Compounds, TAM Refractories, plus many other materials for almost every phase of modern ceramics.



**CHEMICAL DIVISION**

TAM Industrial Chemicals are so diversified, and their applications so manifold, that hardly a processing industry exists where the finished product cannot be made either better or more economical—or both—with a TAM Chemical. TAMCO Development Engineers and the services of the TAMCO Laboratories at Niagara Falls are available at all times to co-operate with manufacturers toward product betterment.

**THE TITANIUM ALLOY  
MANUFACTURING CO.**

General Offices and Works  
Niagara Falls, N. Y.

Executive Offices  
111 Broadway, New York City



**WELDED**

**Solid Steel Windows  
and  
Industrial Steel Doors**

**Federal Steel Sash Company**  
Waukesha, Wisconsin

**MAIL RETURNS**

(Continued from page 316)

FROM JOHN C. ALDEN, '35:



The subject I am submitting was taken from the rear of a fast-moving train on the track at the left. The place is in the Mohawk Valley, east of Little Falls, N. Y., on the main line of the New York Central. . . . The picture does generate thought of motion as . . . the photograph was snapped from a train moving about 70 miles per hour and . . . the freight on the right was traveling about 45. . . . I used an ordinary Brownie No. 2.

Newton, Mass.

*Photography by Formula*

FROM BENJAMIN GINSBURG:

You people should really read your own magazine. Take my word for it, the parts that each person can understand are very interesting to him. I suppose you did not understand the paragraph about perspective on page 217 [April Review]. If you had, you would not have calmly disregarded those same perspective rules throughout your magazine. To this you will answer that space is costly and you must print your pictures small. To that I reply: Reread page 217 and try to follow the arithmetic I set forth below.

Your author states that viewing angle should equal taking angle, and minimum viewing distance should be ten inches. I add that focal length times linear enlargement equals viewing, or principal distance (Clerc). This results in the formula:

$$\frac{\text{viewing distance (10'' or 20'' in hand)}}{\text{a dimension of the print}} = \frac{\text{taking distance}}{\text{a similar dimension of the object}}$$

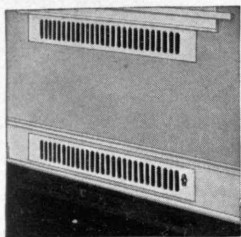
With a given-size print, as in illustrating your own magazine, a given-sized object, and a ten-inch view, the taking distance can be solved. By this I mean that if you know how much space you have, you can actually specify to your contributors the angle their scene should cover when actually photographing.

For a magazine to write what you did on page 217 and then calmly disregard it over and over again in the same issue is a direct insult to anyone who has ever held a magazine illustration at the tip of his nose, or backed ten feet away from a minnie blowup. Of course, you did not have my formula, which is very new (at least to me). However, see to it that you mend your ways in the future.

Editor: Are there other readers so acutely sensitive to distortion that they feel the need of having Review photographers relate their taking (Continued on page 320)



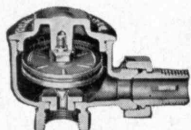
Webster Equipment  
Used in the  
New York State  
Teachers Association  
Office Building



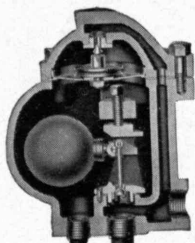
Concealed  
Webster System Radiator



"Three-Point" Valve used  
on exposed radiators



Webster 702 Trap



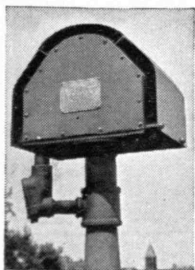
Series 26  
Combination Float and  
Thermostatic Drip Trap



Vacuum Gauge



Intermediate  
Metering Orifice



Outdoor Thermostat  
which provides  
"Control-by-the-Weather"



Boiler room of New York State Teachers Assoc., Office Bldg., showing  
left to right: Boiler with Oil Burner, Webster Boiler Protector,  
Control Valve, Variator, Webster Moderator Control Cabinet.



Office Building of the New York State Teachers Assoc., Albany, N. Y.

## BALANCED HEAT FEATURES FINE OFFICE BUILDING

*Webster Moderator System Provides Low  
Cost Operation and Uniform Heating*

**"CONTROL-BY-THE-WEATHER"**

Albany, N. Y.—Heating results in the new Office Building of the New York State Teachers Association have fully justified the confidence of the owners in the Webster Moderator System of Steam Heating.

When this building was under construction in 1934, it was emphasized that the heating installation must provide economy in addition to maximum heating comfort.

Seeing in the Webster Moderator System centrally controlled heating responsive to outdoor weather conditions and offering continuous delivery of steam to all radiators without overheating, the owners authorized H. O. Fullerton, prominent Albany architect, to specify the Webster System and Webster System Equipment. William Bennett, heating contractor of Selkirk, N. Y., made the installation.

"With the Webster Moderator System, all sections of the building heat evenly and rapidly," the Owner states. "There is no

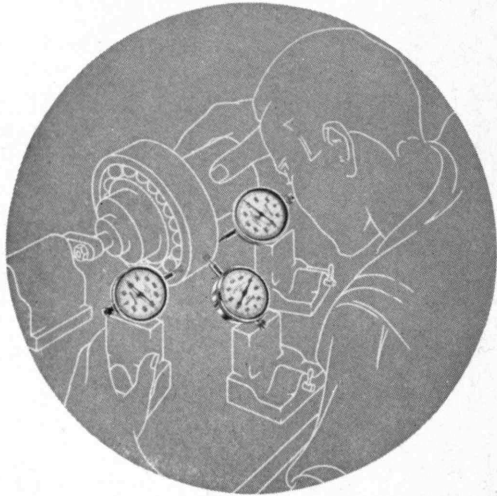
overheating during periods of mild weather. As for economy, the Webster Moderator System has equalled our expectations."

Accurately sized Webster Metering Orifices, placed in branch mains and in radiator supply valves, provide perfectly balanced heating service. The main steam control valve, actuated by the Outdoor Thermostat, controls the basic rate of steam delivery. A manual Variator allows the operator to meet special conditions, such as heating up.

Concealed Webster System Radiators, recessed in the walls, increase the amount of available floor space. Attractive grilles harmonize with the decorative scheme.

In addition to installation in the new Office Building of the New York State Teachers Association, the Webster Moderator System also was selected for the heating of the new Women's Dormitory of the New York State Teachers College in Albany.

If you are interested in heating new buildings or in improved heating service and lower heating cost in your present building, address H. F. MARSHALL, '19, Advertising Manager WARREN WEBSTER & CO., Camden, N. J. Pioneers of the Vacuum System of Steam Heating Representatives in 60 Principal U. S. Cities—Est. 1888



### For PRODUCTION INSPECTION

Starrett Dial Indicators are made in a complete range of standard sizes and dial calibrations or special indicators can be developed to suit your gaging operations. The second edition of the Starrett Dial Indicator Catalog L just off the press illustrates and describes the entire line of STARRETT and LAST WORD Indicators. Write for a copy.

**THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.**  
*World's Greatest Toolmakers—Manufacturers of Hacksaes Unexcelled—Steel Tapes, Standard for Accuracy*

*Standardize on*  
**STARRETT TOOLS**  
 BUY THROUGH YOUR DISTRIBUTOR

### for Joining and Repairing CONVEYOR BELTS



FLEXCO HD BELT FASTENERS make a tight butt joint of great strength and long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Five sizes in steel and alloys.

FLEXCO HD RIP PLATES are used in repairing rips and patching conveyor belts. The added width gives a desirable long grip on the edges of the rip. Consultation on belt joining and repair invited. Sold through jobbers and belting houses the world over.

**FLEXIBLE STEEL LACING CO.**

4630 Lexington Street Chicago, Illinois

In Eng. at 135 Finsbury Pav. London, E. C. 2.

Sole Manufacturers



### AT COULEE DAM

On the high speed 60 in. conveyors, handling up to 2,500 yards of rock and earth per hour, FLEXCO HD FASTENERS are used and FLEXCO HD RIP PLATES were developed. They have been the means of returning thousands of feet of ripped and punctured belting to satisfactory service.

## MAIL RETURNS

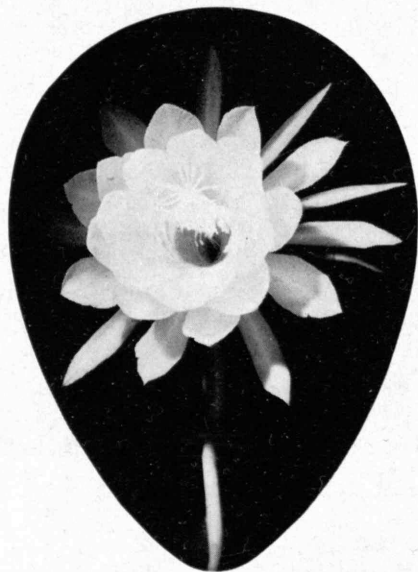
(Continued from page 318)

distance to readers' viewing distance? The editors have long toyed with the idea for application to special pictures, have been familiar since taking college physics with the simple relations involved, but as yet have not been able to devise a formula for regimenting photographers. This mild difficulty Mr. Ginsburg brushes aside in a second letter.

. . . To regiment the photographers would not be so difficult. First, convince the photographic magazines. Then have all magazines draw up specifications according to the angle the smallest picture they print should cover. The photographic agencies and the advertising agencies can give these specifications to their photographers. . . .

FROM W. L. WHITEHEAD, '13:

The inclosed photograph [night-blooming cereus] was taken . . . by my nephew, Frederick G. Perry, Jr., 14 years old. He is the son of F. Gardiner Perry, '09. Cambridge, Mass.



Fencing at M.I.T.

FROM R. E. BAKENHUS, '96:

The primary purpose of physical education for the student is to contribute to the well-rounded man after school, to give him health and strength and the ability to do things in his chosen profession with the best results. It should contribute materially to his good health both while at school and in after life. The young man should acquire a good posture, knowledge of what strains his body will stand, and how to get the most out of himself without injury. Physical education and exercise should have expert supervision and each man, while given the widest latitude of choice, should be guided to those exercises which are best suited for him.

Sports and games indulged in to a reasonable extent are excellent as a part of a well-rounded physical education. They give recreation and fun. The association with others is a benefit and results in lifelong friendships. Competitive sports, if not carried to excess or beyond the physical capacity of the individual, have a great value. They are stimulating; they teach a man how to put forth his best effort in a crisis and also how to prepare for such a crisis. The lessons learned may be applied to the efforts and crises of later life, if they are well learned.

(Concluded on page 386)



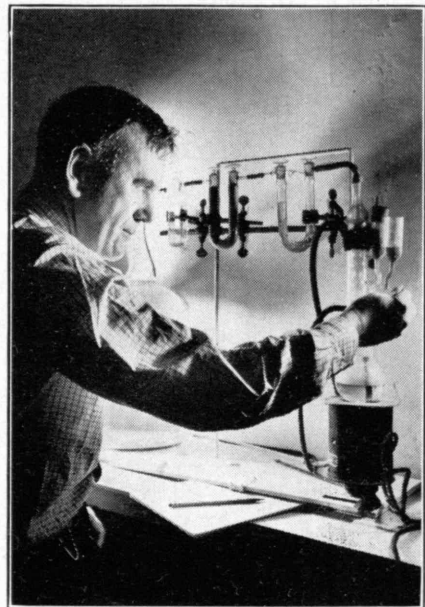
# CHEMICALS: MODERN WIZARDRY

## HOW PREHISTORIC MAN USED CHEMICALS

*... 300 years of American chemistry... influence of the World War... the industry today... a word about the engineer's contribution.*

**A**GES before man had learned to write, long before he had invented the wheel, before he had even a vague idea of chemical laws—he had put chemicals to work for him.

He used leaves and bark to tan hides, he buried fish and ground bones to fertilize his land, he found ways to bleach linen—but in all these processes he used materials nature provided. He was unaware of the reactions involved. He surrounded his chemical activities with elaborate ritual to enlist the aid of the mysterious spirits that seemed to be in everything.



### RESEARCH IS VITAL...

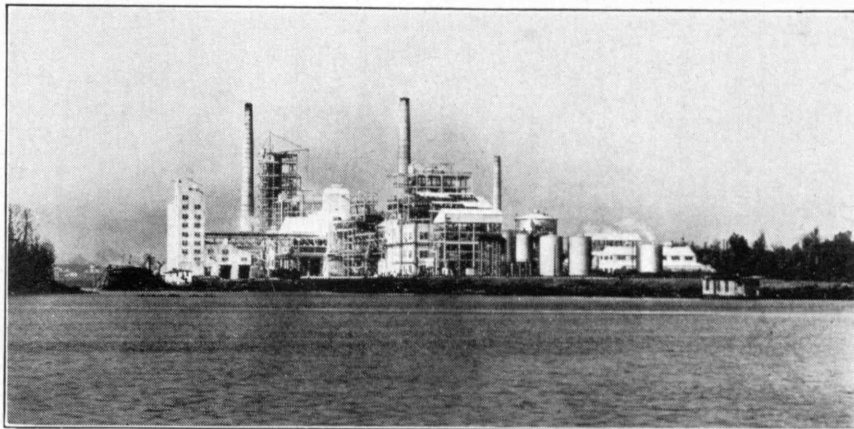
*in the development of the chemical industry. Precise, scientific analysis precedes the launching of every new chemical technique. Among the many contributions of this modern wizardry are cellophane, rayon, bakelite, alloy steels, new plastics, special types of glass, quick-drying lacquers and synthetic rubber, leather, perfumes and dyes.*

In America the chemical industry dates from 1635, when the first plant was established in Boston by John Winthrop, Jr. It produced only alum and saltpeter. From this small beginning grew the industry which today produces over 4,000 commercial chemicals.

Until the nineteenth century, however, chemicals served principally as an accessory to other industries—

compounds for conversion into munitions and fertilizers; others were constructed to transform coal into dyes and medicinal products. In many ways, chemistry met the demands of a constantly expanding industrial civilization.

Today research is encouraged, ingenuity and initiative rewarded. The economic significance of the industry is generally appreciated.



THE \$7,500,000 LAKE CHARLES PLANT OF THE MATHIESON ALKALI WORKS, INC. ... one of the recent large industrial undertakings and a fitting monument to 300 years of chemical progress in America. This plant, built by Stone & Webster Engineering Corporation, produces soda ash, caustic soda and other chemicals used in refining oils, and in manufacturing rayon, paper, glass, soap, dyes.

textiles, dyestuffs, metals, papermaking, ceramics. Then scientific analysis of molecular structure was begun. As tradition, chance, trial and error became things of the past, chemistry took an increasingly important role in industry—although one not generally appreciated prior to the beginning of the World War.

By 1914, it had already achieved, through slow, regular progress based on research, an annual output exceeded in value only by the food, textile and steel industries. But its exploits had been overshadowed by the more obviously dramatic advances of American civilization—developing such extractive industries as petroleum, mining, lumbering; building railroads, highways, canals, and electric-power and communication systems.

The war brought about in the United States a shortage of many necessary industrial materials. Most needed were chemicals for the manufacture of munitions and dyes. They were essential. To meet this deficiency, the American chemical industry built large plants in which nitrogen, drawn from the air, was “fixed” into basic

Old monopolies based on limited natural supplies have been broken by the synthetic products of chemistry. It has created new industries. In addition, it is helping conserve our resources; it is giving us new, better and cheaper goods; it is serving the whole country.

Workers in the chemical industry have shared in its progress. All through the past depression years, wage rates were considerably higher than the average in all industries, and employment in chemical plants showed a high degree of stability. Meanwhile, the average price of chemicals has been reduced below the prewar level.

The chemical engineer has contributed to this progress by adapting the discoveries of the chemist working in the laboratory to the uses of commerce and industry.

Stone & Webster Engineering Corporation, with its background of many years of experience in the chemical field, is prepared to serve the industry. Its trained and co-ordinated staff can assist quickly and economically in the development of plans from the basic flow sheet, and translate them into a working plant.

## STONE & WEBSTER ENGINEERING CORPORATION

# "YOU CAN'T WRITE TOO STRONG AN AD ABOUT IT!"

**T**HE words quoted above tell you what the Cloverleaf Dairy of Springfield, Missouri, thinks about the Goodyear COMPASS Belt on their ammonia compressor drive, so we'll let you judge from the facts.

It would be hard to find a drive operating under any more difficult conditions. Water from steam condensation and defrosting ammonia pipes keeps the belt in a continual "rain" under which it must keep running 24 hours a day.

At first the most expensive types of so-called "waterproof" belts, costing approximately \$100 each, were used on this drive, but they only lasted from nine to twelve months before

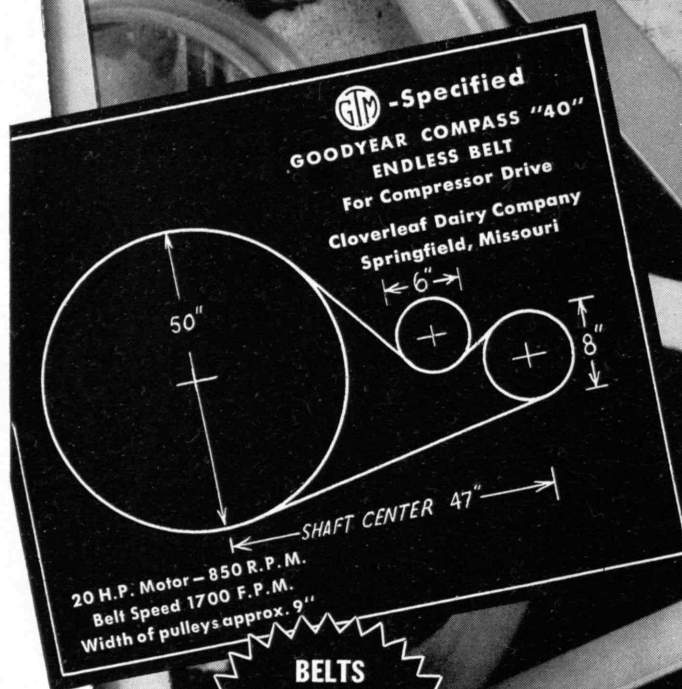
the dampness caused separation and failure.

## Four years without a shut-down

Then the G.T.M.—Goodyear Technical Man—was called in and on his specification a Goodyear COMPASS "40" Endless Belt was applied to this drive in February, 1933. Today, it is still performing perfectly; has never required repairs, caused a shut-down, or lost a minute's time.

But here's the most astonishing fact of all. The Goodyear COMPASS cost exactly \$22.50. In other words it has given over *four times* longer service at less than *one-fourth* the cost of previous belts—or more than 16 times greater value!

With records like this, and they are many, there is no need to "write" advertisements.



**BELTS  
MOLDED GOODS  
HOSE  
PACKING**

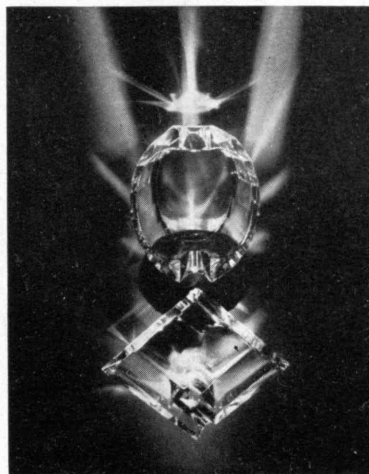
Made by the makers of  
Goodyear Tires

To bring the G.T.M.  
to your plant, write  
Goodyear, Akron, Ohio,  
or Los Angeles, California  
—or the nearest Good-  
year Mechanical Rubber  
Goods Distributor.

THE GREATEST NAME IN RUBBER

# GOOD YEAR





F. S. Lincoln, '22

# THE TECHNOLOGY REVIEW

Title Reg. U. S. Pat. Office

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 39, NO. 8

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JUNE, 1937

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*"Torpedoes of the Sea (Porpoise)" © by Harold Haliday Costain*

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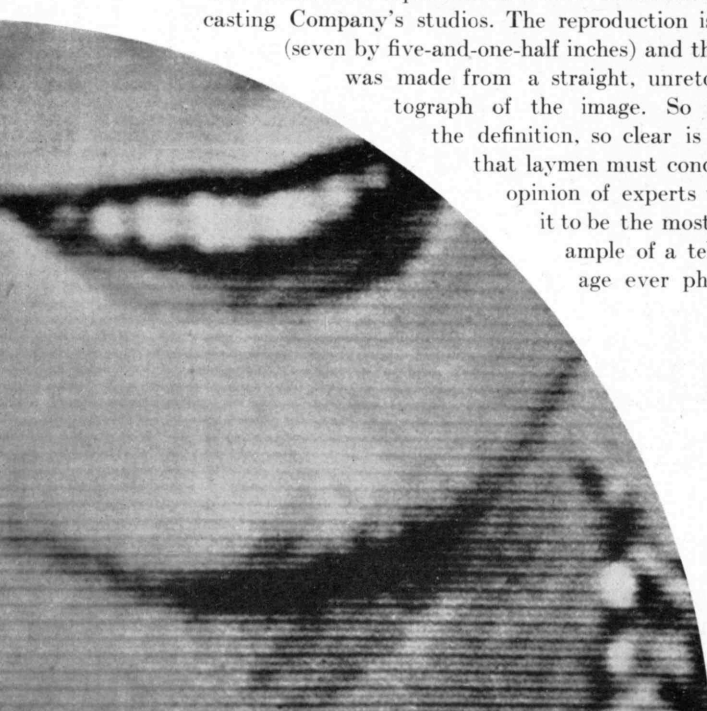


## This Is a 1937 Television Image

... reproduced exactly as it appeared on the cathode-ray tube screen of an experimental receiver in the National Broadcasting Company's studios. The reproduction is actual size (seven by five-and-one-half inches) and the engraving was made from a straight, unretouched photograph of the image. So startling is the definition, so clear is the picture that laymen must concur with the opinion of experts who declare it to be the most perfect example of a television image ever photographed.

The subject is Miss Betty Goodwin, and there are good reasons for her smile. From the ranks of National Broadcasting Company's press department, a parade of electrons carried her to the pioneer post of NBC's first woman television announcer.

As described on the opposite page, nimble equipment transmitted six million picture elements a second to throw her smile on the screen. The white line at the left edge of her face is produced by spot lighting, applied for the purpose of helping this equipment make a sharp distinction between cheekline and hair. Television will evidently require a lighting technique of its own just as it will certainly require a new program technique.



*At the left, greatly enlarged, is a small portion of the above image, showing the line structure and the intricacies of the shading in each line. The complete image contains about 441 lines, each line composed, theoretically, of 588 elements of light and shade. The light is produced in the image by the bombardment of a high-speed beam of electrons impinging on a fluorescent screen. The beam moves from left to right along each line, changing in intensity as it goes, starting at the beginning of each new line successively. In the image shown, the progression of scanning was interlaced; every other line was skipped on the first scanning (consuming 1/60 of a second) and the gaps filled in with alternate lines on the second scanning, bringing the total picture time to 1/30 of a second. These electrons do move!*

# THE TECHNOLOGY REVIEW

Vol. 39, No. 8



June, 1937

## The Trend of Affairs

### *Television Casts Its Shadow*

**A**MONG the coming events on the scientific horizon none has greater appeal than the art of visual broadcasting. The whole population knows the meaning of the word television, but not one in a hundred thousand has ever witnessed a demonstration of its present accomplishments. In view of the progress made during the past five years, this reticence on the part of television researchers is unfortunate but easily understandable. The interests behind the research have staked far too much to be willing to gamble on establishing a service until it is sure of public acceptance.

Early experiments proved once and for all that satisfactory reception of television pictures was not an affair for the home constructor. The problem is far too difficult. So it has been left to the large manufacturers and wealthy independents who could afford to cast much financial bread on the technical waters. This broadcasting has been instructive, if not remunerative. The engineers know, for example, that a satisfactory television image must consist of no fewer than 200,000 separate elements of light and shade\* and that the picture must be sent 30 times each second, motion-picturewise, to carry the illusion of motion. That makes six million picture elements to be sent each second, which is quite a few elements in a short time — no affair, certainly, for the home constructor.

To send this enormous number of picture impulses so rapidly requires the most nimble equipment it is possible to devise. The basis of this equipment is the

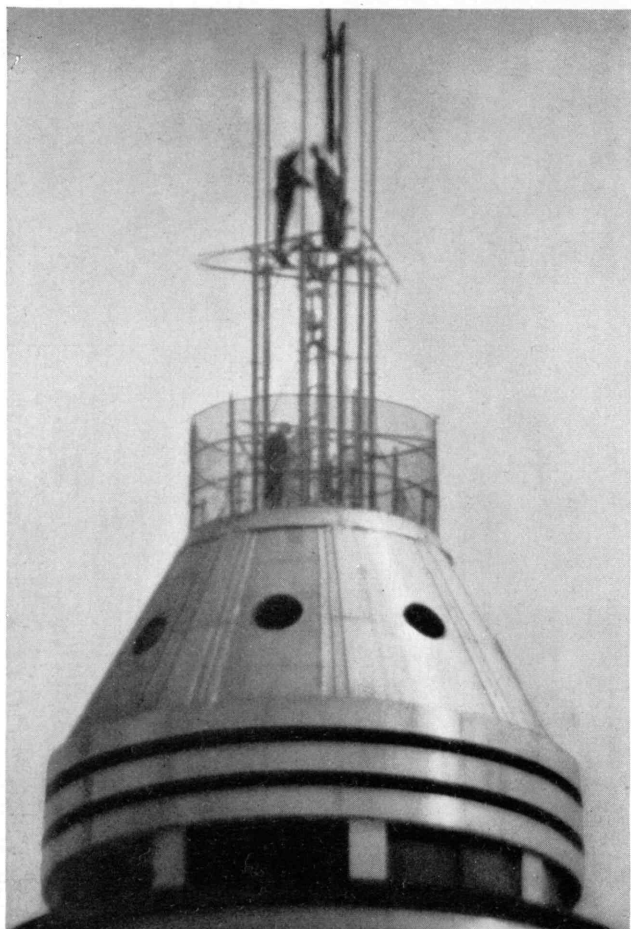
electron, whose weight is so small compared with its possible energy that it can readily cope with many millions of impulses per second. But the electronic devices which perceive the image at the studio and recreate it in the home are expensive, as is the associated equipment which sends and receives the impulses. The current market price for a television transmitter, installed, is \$300,000. Receivers cost roughly one thousandth as much. In England, where receivers are on public sale, the prices range from 55 to 90 guineas, or roughly \$280 to \$465.

Cost is one problem; talent and program technique are others. In England, the landed gentry who own receivers are delivering loud protests against the quality of the program material. Apparently a movie-trained nation is content with nothing less than superspectacles. But there is not enough talent to supply even a middling superspectacle every night in the week — not even if all concerned were willing to contribute their services to the cause of art.

There are also important technical limitations. Transmitting six million picture elements per second calls for a type of radio wave which vibrates about ten times faster, that is, sixty million times per second. These radio waves (they are called ultrashortwaves because they measure about five meters in length, in contrast with the 200- to 500-meter waves used in sound broadcasting) have the disconcerting property of traveling in straight lines. Therefore, under normal conditions they travel only to the horizon and a little beyond, before they are lost in space. So tall towers are used for television transmitting antennas. In its experiments, RCA uses the Empire State Building; the Columbia Broadcasting system intends using the Chrysler Building. But even these spires cannot push back the horizon more than 25 miles. The reliable range of television

\* The present standard, shown opposite, is 441 lines per picture, with 588 elements per line, or 259,308 elements per picture. In practice, however, no more than 200,000 elements are achieved because of circuit limitations and the necessity of sending synchronizing impulses along with the picture impulses.





Electronics

#### FROM HERE TO THE HORIZON

*Telephotograph showing the erection of the triangular television transmitting antenna atop the Empire State Building in New York*

transmitters is thus certainly no more than 40 miles. Each city must, accordingly, have its own television station, but the number of stations in any one locality is limited to seven, so restricted is the available space in the ether with respect to each station's requirements. Furthermore, the interference radius of a transmitter is roughly twice its service radius, so that stations in Philadelphia will probably interfere with stations in New York. The seven frequency assignments must, therefore, be shared between these two great population centers unless directive antennas or other devices are used to prevent interference. Any smaller city within the interference radius of these centers can have no station at all. Television is for city dwellers and suburbanites only; the farmer and small-town dweller cannot be served. Network connections between television stations will be expensive, if available at all. The only telephone cable now capable of handling a television program is the newly installed coaxial cable between New York and Philadelphia. One television network connection requires facilities adequate for 1,000 simultaneous telephone conversations, and the cost is in proportion.

The total investment in television research in this country has never been computed, but it must certainly be well above the five million dollar mark. In view of

the difficulties which beset the establishment of television service, it might seem that there is small chance of making the investment good, but there are unmistakable signs that the industry is preparing to take the chance, in the not-too-distant future. One step has been taken by the manufacturers: The Radio Manufacturers Association, representing all the television and radio-set interests, has drawn up a list of standards on which the manufacture of television transmitters and receivers will be based, and has recommended its adoption to the Federal Communications Commission.

Another sign is the appearance of a competitive situation in the broadcasting networks. For a year the National Broadcasting Company (an RCA subsidiary) has been operating an experimental television system, with studios in Radio City and a transmitter atop the Empire State Building in New York City. Engineers of the company have been viewing the pictures through receivers installed in their homes. Program technique is being developed. Six months after the system began operation it was completely overhauled to make possible an increase of about 30% in picture definition. It is now, according to public statements, running on a regular test schedule. Into this situation a new figure has projected itself in the person of the Columbia Broadcasting system. Columbia contracted to buy from RCA a complete television broadcast transmitter, similar to that used by NBC, and in April announced to the Federal Communications Commission that it intended spending \$500,000 on this and other equipment. The reason for Columbia's entry into the field is veiled in generalities; the trade is sure that it is not philanthropic.

The quality of the pictures which can be sent over the new high-definition system is truly remarkable. The definition (roughly 200,000 elements per picture) is such that the lines of which the picture is composed are indistinguishable when the picture is viewed from a minimum distance equal to four times the picture height. A picture seven inches high (about the maximum size now practicably obtainable without the use of projection equipment) has no visible line structure when viewed at 28 inches. This corresponds nearly to the definition present in a 60-line-per-inch newspaper half-tone engraving of the same size. The color of the pictures in the latest picture tubes is black and white, with a faint tinge of blue or yellow. There is no flicker or unsteadiness of any sort when conditions are correct. Pictures 18 by 24 inches in size and of high brilliance have recently been produced by projection tubes which use a three-inch fluorescent screen and project the image on a wall through an  $f.1.4$  lens. The projector tube, described for the first time on May 12 before the Institute of Radio Engineers, is still highly experimental and its useful life is short. But fundamental research in fluorescent materials now in progress gives encouragement that this difficulty will soon be overcome. The pickup camera can operate on any available subject from a postage stamp to a ball park, provided only that the illumination level is of the order of several hundred foot-candles.

In all, the technical accomplishment of the past year is great; in fact, technical difficulties are fast becoming the least of the obstacles which now remain in the path

of regular television service. Those willing to predict the beginning of the service say it is at least a year away — possibly three years at the outside — but no bets have been placed, even on the latter figure. The stage is being set; for date of opening, see your local paper.

### *Singing Propellers*

**A**NOTHER question without an answer has been added to one of the toughest jobs in the field of engineering — the design of marine propellers — by the increasingly frequent appearance of screws which "sing." The song can hardly be described as musical, but it has a brazen timbre and is generally of a definite pitch. Besides interfering with the comfort of passengers and even with the navigation of the ship, particularly in fog, the noise has been so loud in some cases that classification authorities have refused to grant seaworthy certificates and owners have declined to accept delivery.

Conditions which cause the phenomenon are apparently quite critical, for two propellers on the same ship rarely emit the same volume of noise, while presumably identical propellers on a sister ship may operate quite satisfactorily. According to Harry Hunter, British naval engineer, the conditions responsible for the trouble are not dependent on the type of hull, the design of the power plant, the metal of which the propeller is constructed (although cast-iron screws will seldom sing), or on the use of airfoil blade sections, in spite of the fact that the adoption of such sections coincided with the appearance of the phenomenon. When cast iron is used, however, rapid pitting indicates that singing is perhaps another manifestation of the forces causing erosion and cavitation.

Hunter suggests that the existing forces are probably eddies, while the modulus of elasticity, the elastic hysteresis, and other characteristics of the metal determine in considerable measure the responsiveness of the propeller. Accuracy of finish also seems to be a controlling factor. Only by the costly and unsatisfactory procedure of substituting a cast-iron propeller for the offending screw can a cure be guaranteed.

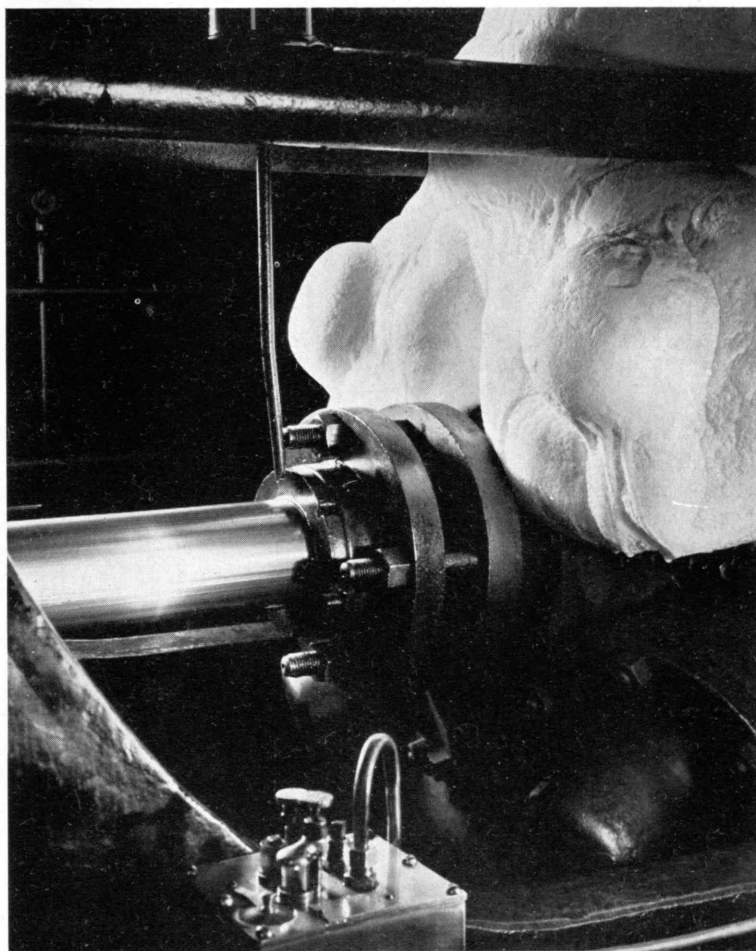
### *Artificial Daylight*

**D**AYLIGHT provides plants with energy for the photosynthetic transformation of carbon dioxide and water into food and growth. Carbon dioxide may now in turn be expected to provide daylight to supply plants with the energy component of the process of photosynthesis, as a result of the perfection of a carbon-dioxide lamp which has practical and immediate applications in work requiring the dependable reproduction of daylight conditions. Invention by Thomas J. Killian, '25, of an electronic pressure-control device is the event which has made possible the satisfactory utilization of carbon dioxide in this way. This device maintains constant pressure of

carbon dioxide in a tube, where it is rendered luminous by the passage of an electric current, as is done with neon and other inert gases.

Perfection of a carbon-dioxide lamp is of distinct importance because it has long been known that, of the common gases, carbon dioxide has a densely filled, well-balanced spectrum with a luminosity distribution very close to that of cloudy north skylight, or average daylight. This, under which the human eye evolved, is the accepted standard for the production, discrimination, and appreciation of colored objects. In the orange-red section of the spectrum, for instance, cloudy north skylight shows a distribution of energy in the visible range of 29%; the carbon-dioxide lamp, 29.5%; and incandescent tungsten at 2,848 degrees K, 64.3%. In the other divisions of the spectrum, the variation between the carbon-dioxide lamp and optimum daylight conditions is of the order of only one per cent. The value of the controlled conditions made possible by the lamp in all sorts of color comparison is obvious.

While neon, an inert gas, disappears very slowly from a tube, carbon dioxide becomes extremely active when ionized, and must be replenished. For this reason it had not been utilized before. The pressure range for satisfactory operation of a carbon-dioxide lamp is only about one one-hundredth that of neon, so that the



*Young and Phelps*

#### FROST

*... sculptured these obese contours on the ammonia compressor of a refrigerator machine*



Paul J. Woolf

#### THE MODERN EYE

*... taught by the wide-angle lens accepts distortion when used as effectively as in this night photograph of the RCA Building in New York exhibited in the Fourth International Salon of the Pictorial Photographers of America*

mechanism for maintaining pressure must be very sensitive to slight changes in pressure and insensitive to changes in line voltage. The electronic device, the Baratron, developed by Dr. Killian, holds the pressure within a few per cent of normal at all times. It is adaptable to other uses where accurate regulation or recording of pressures is desired.

Like other discharge lamps, the carbon-dioxide lamp is subject to no variations because of voltage changes, for these affect only the intensity of the emitted light and not its relative spectral distribution, which determines its color. The quality or chromaticity of the carbon-dioxide lamp, moreover, remains unchanged throughout the life of the tube because of the continuous supply of fresh gas. In practical application, one typical lamp consists of 25 feet of 25-millimeter tubing bent back and forth into a grid, giving a uniform and glareless light source, three square feet in area. A current of about one fifth of an ampere is supplied by a standard luminous tube transformer, and the power consumption is 600 watts. The resultant lumens-per-watt efficiency is not so high as that of most discharge lamps but is

higher than that attained with filtered incandescent daylight lamps which hitherto have been used.

Dr. Killian, under whose direction this lamp was developed, is executive vice-president and director of research for the Barkon Tube Lighting Corporation of Seattle. He is continuing the investigation of the development and application of all types of gaseous discharge lamps. Another Institute graduate concerned in this development is Frank McGinnis, '25, President and General Manager of the Barkon-Frink Tube Lighting Corporation, a subsidiary of Barkon Tube.

#### Significant Traces

THE human body contains approximately enough iron to make a fair-sized nail. This relatively small amount of iron is essential to life; iron compounds of the blood carry oxygen from the lungs to all parts of the body. The few grams of iron, too, constitute far more than what the chemist considers a trace. A trace is something in the neighborhood of the smallest amount which can be detected by chemical tests. The total amount of iodine in the body is small, but the relative amount of it in thyroxine, the hormone of the thyroid gland, is relatively large. Our foods must contain traces of iron and of iodine to maintain in the body the amounts of these elements which are needed.

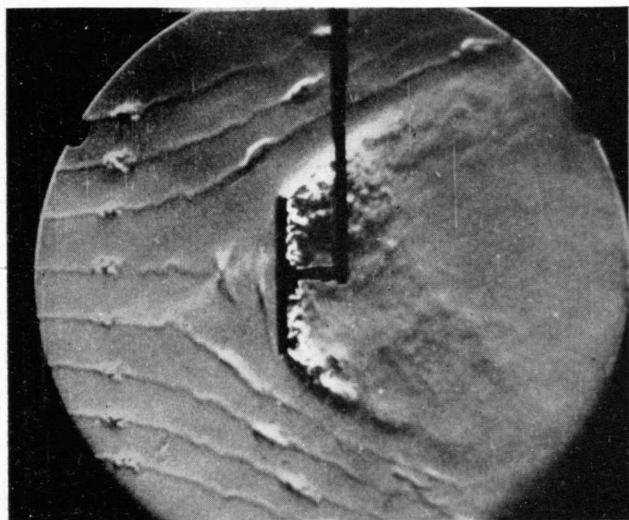
Recent researches have shown that traces of many other elements, often of elements which are by no means abundant, are absolutely necessary for the growth of plants and animals. Traces of boron in the soil are essential for the successful growing of tomatoes; traces of manganese in the food appear to be needful for the reproduction of animals. The whole human body contains very little copper, yet a trace of copper in food appears to be essential.

While we understand the part which iron and iodine play in the body, there are many other elements whose functions we do not at present understand, which nevertheless must be present in our food, if only in infinitesimal amounts, in order that we may live in perfect health. The mineral constituents of our diet, for example, are as important to us as the vitamins. When all is said, the minerals come to us from the soil. This is true whether we eat the vegetable food which is grown from the soil or eat the animals which have fed upon the vegetation.

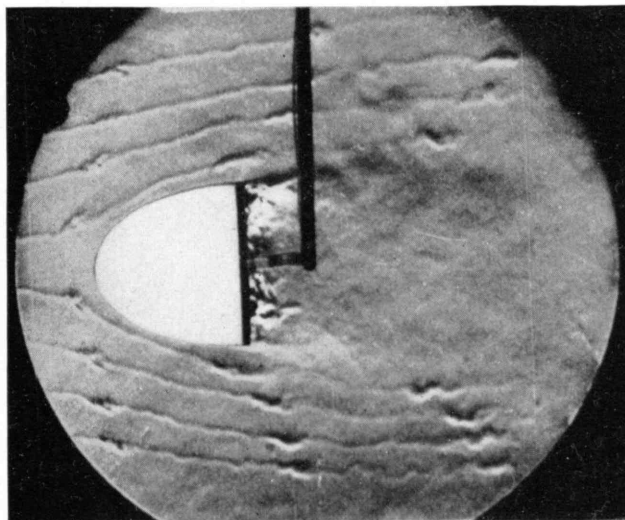
In a recent address on the effect of selenium in the soil, Dr. Henry G. Knight, chief of the United States Bureau of Chemistry and Soils, remarked that "there is every indication that the bluegrass region of Kentucky — famous for its beautiful women, fast horses, and good whisky — possesses a soil that has an ideal combination of chemical elements, particularly elements such as manganese, calcium, phosphorus, nitrogen, iodine, and potash, but also many other less evident elements of which we have little knowledge."

Because of their great economic importance, the effects of traces of cobalt and selenium in the soil are the objects of intensive study at present. The bush sickness

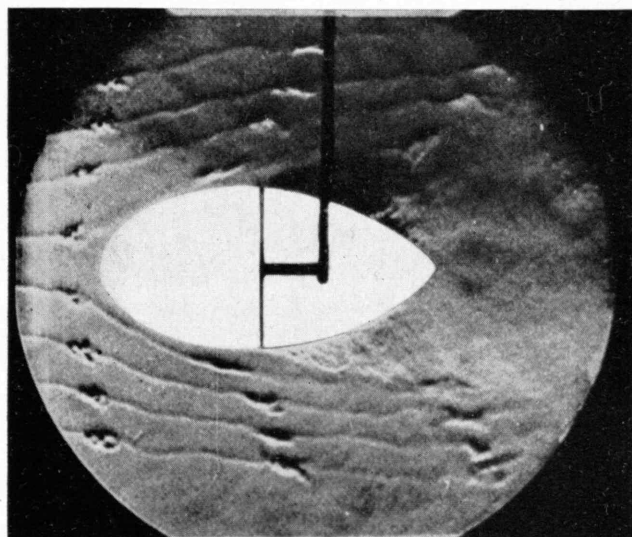




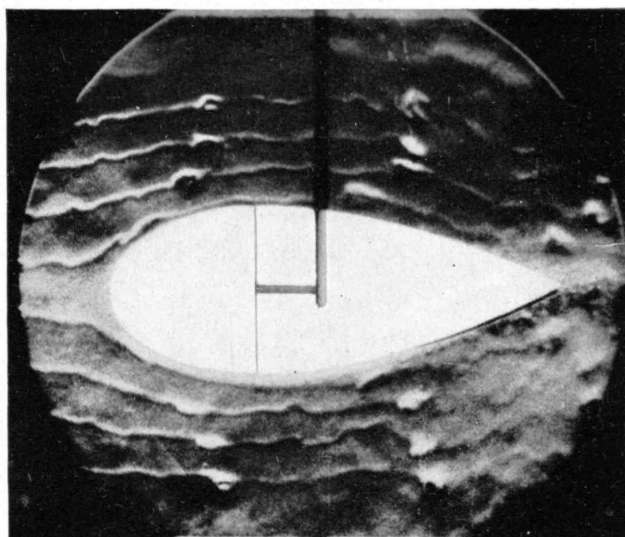
1



2



3



4

Royal Air Force from Black Star

#### SEEING THE EFFECTS OF STREAMLINING

*In England's National Physical Laboratory, physicists have made motion pictures, from which the above stills were excerpted, showing the flow of air about various shapes, ranging from the flat plate shown in 1 to the highly streamlined form shown in 4. The movement of the air was rendered visible by spark gaps, one-fiftieth of an inch apart, placed just in front of the shape. The sparks produce tiny "dots" of hot air and the heated electrodes, streaks. Shadows of these dots and streaks are the lumps and lines recorded on the film. The decrease in turbulence and the smoothing of the flow are clearly shown as more nearly streamline shapes are introduced. The distance between the lumps affords a measurement of the velocity at different points*

which affects cattle in New Zealand has been shown to be due to a deficiency of cobalt compounds. The livers of healthy sheep contain 0.15 to 0.25 parts per million of cobalt, while those of affected sheep contain only about 0.02 parts per million. Bush sickness is prevented or completely cured by the use of drenches which supply eight milligrams of cobalt per week. The newest experiments indicate that satisfactory results may be procured by adding soluble cobalt salts to the deficient soil. The plants quickly take up the cobalt and from them, naturally, it goes to the animals.

The diseases which are called blind staggers and alkali disease and which kill many cattle in our own country, particularly in South Dakota and Wyoming, have been found to be due to selenium in the soil. Alkali disease is the milder form of the poisoning and is char-

acterized by the loss of hair and by the sloughing off of the hoofs. Blind staggers is the acute form and results in death within a short time. Marco Polo, who brought back a number of tall tales from his travels in Asia, told (about 1275 A.D.) of a place in the Nan Shan where one might safely travel only with the beasts of burden which were accustomed to the country. Other pack animals, not knowing what plants ought to be eaten, would eat the poisonous ones. Sir Aurel Stein, traveling in Turkestan in 1906-1908 as a representative of the British government, had experiences which confirmed the tale of old Marco.

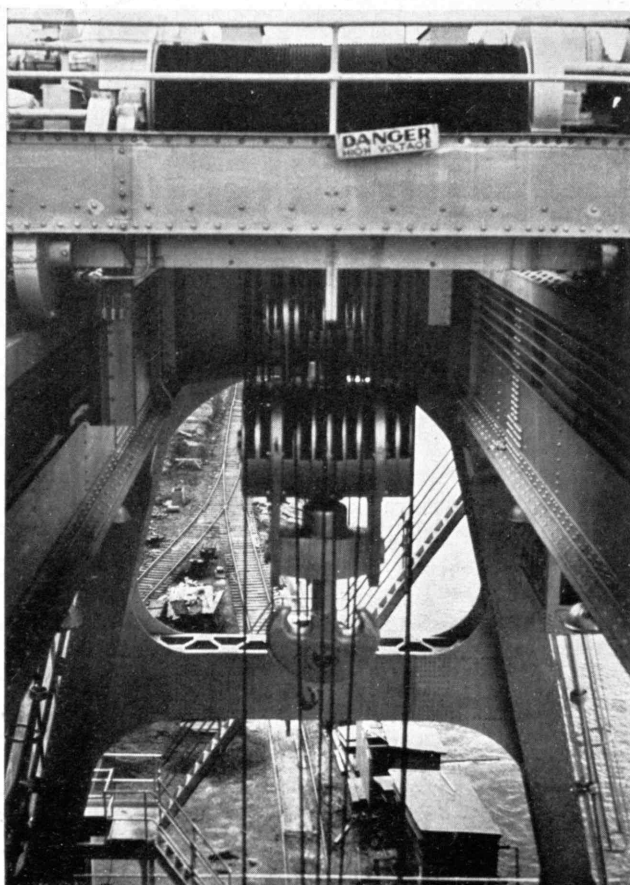
Some plants are selenium lovers; they take up selenium from the soil and are poisonous. Others do not take up the selenium and are entirely harmless. It now appears, therefore, that the control of the selenium diseases

## IN TVA LAND

*The narrow wedge of concrete that is Norris Dam and the many-fingered lake that it impounds. Below. A giant crane towering over the Tennessee River at Wheeler Dam*



Aero Service Corporation



Robert J. Granberg, '35

of cattle, and the consequent prevention of tremendous annual losses, are likely to be secured by the elimination of undesirable plants from the areas of seleniferous soil.

### *The Horn Angle and Newsprint*

**H**OW a technological age intensifies the interrelation of events and activities bids fair to be succinctly illustrated again, through an increase of \$7.50 a ton in the price of Canadian newsprint for 1938. Consequences of that rise will early affect the economic and industrial balance of the United States, speeding up a shift of the geographical center of a major industry, with all the unpredictable results entailed by such a movement. Consequences of the rise may also have considerable influence upon the industrial application of a mathematical puzzle some 2,500 years old.

The jump in the Canadian newsprint figure, bringing the increase in the price during the last three years to 25%, has led the American Newspaper Publishers Association to enter actively into the promotion of a newsprint industry in the Southern United States, where large supplies of fast-growing pine are available. Effort to make domestic publishers independent of importations was regarded as imperative by the association because "such drastic increase" as the price rise "would come close to wrecking a number of newspapers over the country." The association was told that arrangements have been virtually completed for the building of the first mill in east Texas, and that erection of a second mill east of the Mississippi to cover the Southeastern States is in prospect.

The mills are expected to use a process similar to that employed in the making of wrapping paper by kraft mills already in operation in the South (see *The Review*, January, p. 111). Newsprint mills using Southern pine may be set up alongside existing kraft mills, which are readily convertible for the manufacture of newsprint. The fact that American newspapers were printed on wallpaper during the newsprint shortage of 1920 has been cited to meet doubts whether Southern pine newsprint could be utilized.

Dr. Charles Hertý recently announced perfection of a process making possible the use of Southern slash and loblolly pine for the manufacture of paper pulp. The speedy rate of growth of slash and loblolly and their accessibility make them especially useful raw materials, since replacement crops reach maturity quickly. Conceivably this will be given impetus by the publishers' action.

Later still, however, another means of extracting cellulose from low-grade woods reached prominence and may now benefit as Southern pine is tapped as a source of pulp. This process, devised by Matthew J. Stacom, a self-taught engineer, after years of study seeking improvement in ways of extracting cellulose, relies upon a machine capable of producing forces of from 100,000 to 140,000 pounds per linear inch, development of which on a practical commercial scale had hitherto been merely a dream. Controlled at will and produced by very little electric power, these pressures literally force all the liquid substance out of wood subjected to them, leaving behind the cellulose fibers in a practically pure state. Yet the fibers are not injured, and the slight moisture that remains after the squeezing is no longer inside the cells but on their surfaces, so that removal can be accomplished by much less use of chemicals than is now necessary.

The Stacom machine secures these phenomenally high pressures by means of a new discovery concerning the horn angle — the angle formed when two or more curved lines branch out of a common stem. When a cylinder is placed inside another cylinder, touching it at a point, a horn angle is formed. After it had puzzled mathematicians for 2,500 years, Professor Edward Kasner of Columbia told the Harvard Tercentenary Conference last summer of successful measurement of the horn angle by means of a new type of mathematical measuring rod which he had devised.

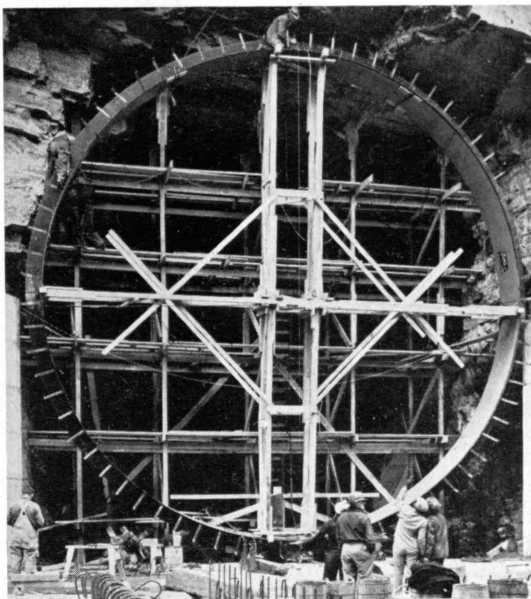
By placing inside each other steel cylinders of such diameters as to form horn angles of definite sizes, and by obtaining a correlated effect of horn angles operated in different planes, Mr. Stacom found that extremely high pressures can be obtained when the cylinders are rotated simultaneously in the same direction. When an ordinary hard steel was used in the experiments, the tiny cellulose cells, passing through the point where the two cylinders touch, made deep dents in the steel surfaces, so great are the pressures. A steel hard enough to withstand them has, however, been found.

Among the many possible applications of the machine, the one likely to be stimulated by the present newsprint situation is that of the utilization of Southern pine cellulose by dehydration of the heretofore main objectionable features — the ether-soluble fats and oils — before chemical treatment of the resultant fiber. The fiber can be stored indefinitely — a fact which may lead to controlled annual harvesting of a regular timber crop for processing, grading, and storing.

## Man Still Migrates

**F**EW pages in history are free from the footprints of wandering hosts. Driven sometimes by the Malthusian devils, sometimes by vast natural cataclysms, occasionally by obscure but powerful promptings of the spirit, even by minute traces of rare chemicals (see page 328), whole populations have been tossed about endlessly, and with them the fate of civilizations.

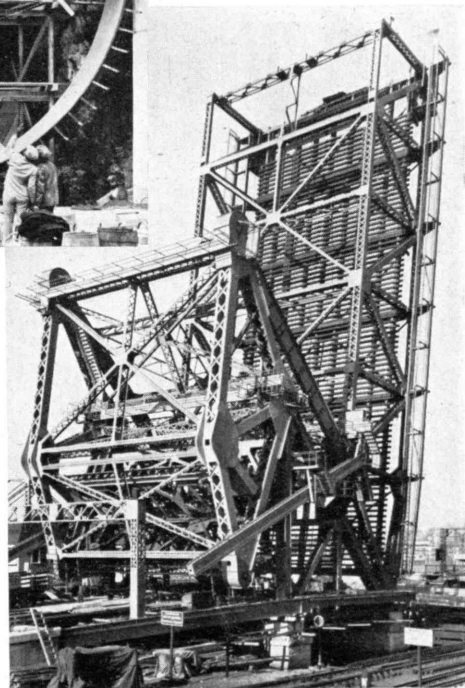
In the past, the forces which inspired mass movements were mainly the hard realities of an environment in which men were as helpless as storm-tossed leaves. Thus, during what is perhaps the greatest period of migration in ancient history, the 4th and 5th Centuries of the present era, the human rivers which flowed out of Asia and pushed before them (*Continued on page 382*)



Galloway

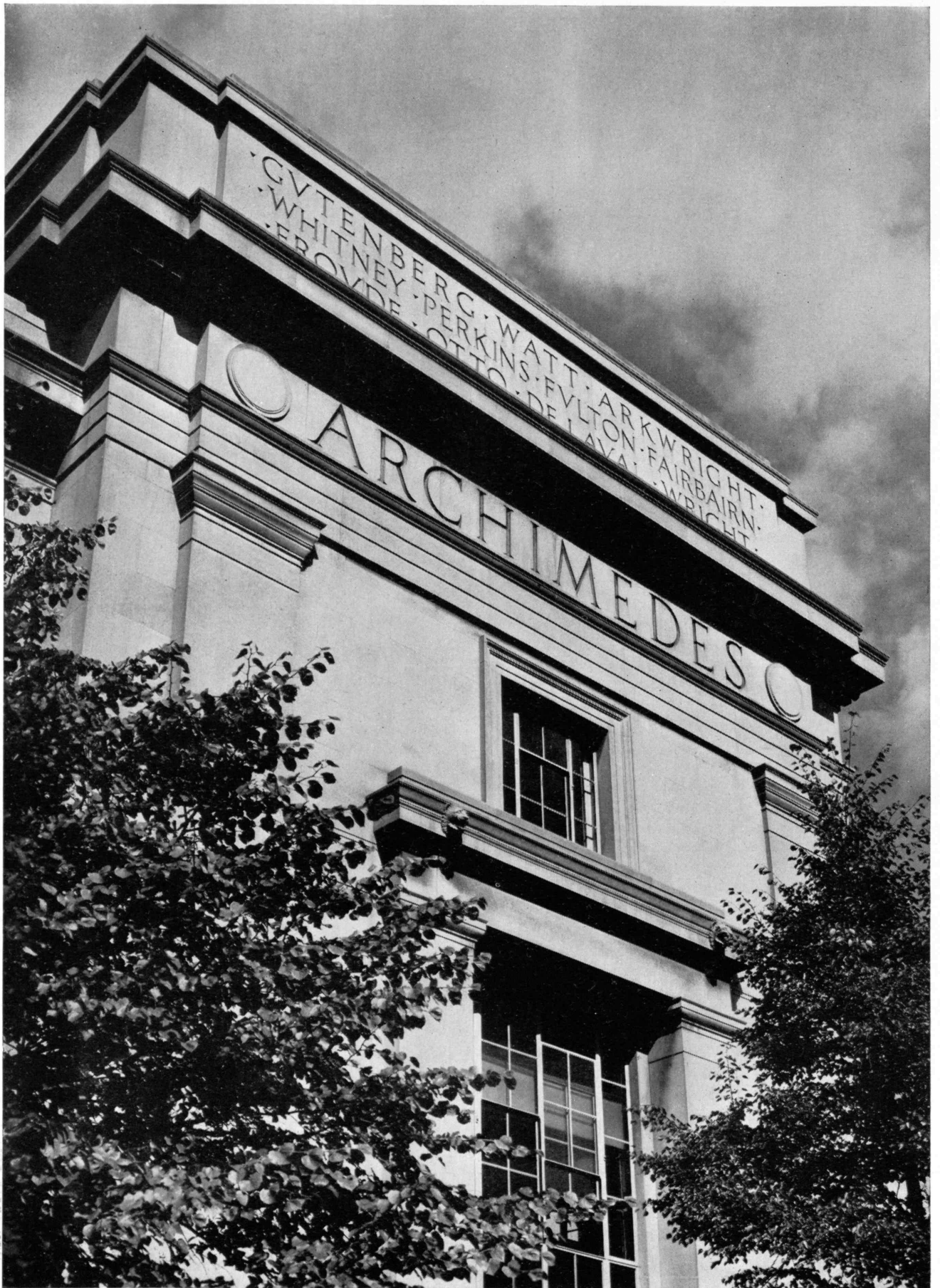
## COMPLEX ENGINEERING CONSTRUCTION

Left. A portal ring being placed in position in New York's Midtown Hudson Tunnel. Below. Bascule span of Boston's Chelsea Street Bridge



T. F. Hartley from Fay, Spofford, and Thorndike





ENGINEERING

# Signals from the Great Outside

## *Exploring the Universe with Cosmic Rays*

BY PHILIP M. MORSE

SOMEHOW it is the most remote which is the most appealing. Facts about the uttermost nebula stimulate the imagination more than facts about a filterable virus, and it seems easier to persuade a patron to underwrite a telescope than to support a metallurgical laboratory. This is not entirely to be deplored, however, for we cannot concern ourselves with bread and butter always, and facts, no matter how esoteric, are always valuable. These far-off facts are hard to get at, for not many of our senses can reach beyond a few miles above the earth's surface. Until recently, in learning about the universe as a whole, we were restricted to visual observation, with an occasional chance at the analysis of a stray meteor. Now we have learned to receive another set of messages from outside, the cosmic rays. At present we know very little of what the messages are, much less what they mean. Only a thin spattering of the rays reach the earth, and it takes all our precise and powerful atom-detecting equipment to record them. How we know they come from outside and the reports they bring from the outer universe we shall indicate later. But let us first review what has been discovered about these rays.

Cosmic rays make themselves known to us by their ability to damage atoms which are in their way; they chip off an outer electron or so, ionizing the atoms. In the cloud chamber we can see the trail of destruction each ray leaves behind it, for fog droplets collect on each injured atom. We see long, straight tracks of droplets, with occasionally a spray of branching ones, indicating a head-on collision with an atomic nucleus, so direct and so forceful that the fragments of the victim bounce off fast enough to become secondary cosmic rays themselves. Cosmic rays are also noted for their penetrating power. They are detected at the bottom of mines and inside huge shields of foot-thick lead. The strongest x-rays and the radiations from radium can penetrate only a fraction of an inch of lead. Only neutrons have a com-

**A NEW ACHIEVEMENT IN UNPUZZLING COSMIC RAYS—HOW THEY ARE USED TO DETERMINE THE MAGNETIC FIELD AT THE SURFACE OF THE SUN—WILL THEY MAKE POSSIBLE ELECTRIC TELESCOPES TO SUPPLEMENT VISUAL TELESCOPES?**

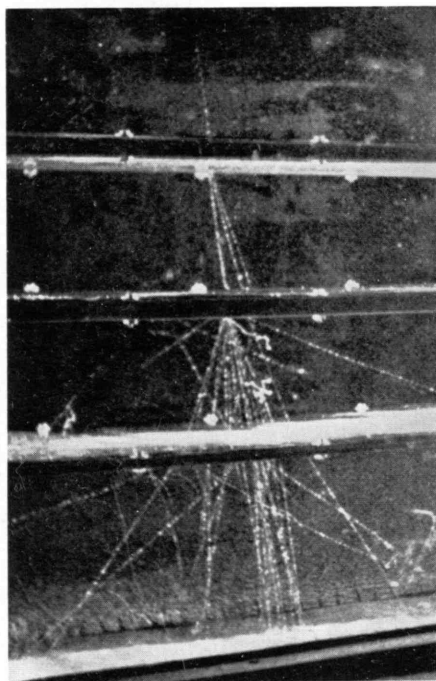
parable penetrating power, but the neutrons we can manufacture cannot produce an equally huge amount of destruction as they go. They haven't the energy to do so.

These cosmic-ray signals from outside have excited the curiosity of many scientists: Arthur H. Compton, Robert A. Millikan, W. F. G. Swann, and T. H. Johnson are investigating them, as are also Professor

M. S. Vallarta, '21, Professor Ralph D. Bennett, Lewis Fussell, Jr., '32 and Professor Robley D. Evans here at Technology; Professor J. C. Street and Dr. E. C. Stevenson at Harvard; and many others all over the world. They are seeking the answers to two questions, which must be answered before we can say we know much about the rays: Of what are the cosmic rays composed? What do they tell us about the universe beyond our atmosphere? Neither question has been adequately answered yet.

As to the nature of the rays themselves, we can find out if they are electrically charged particles by setting our cloud chamber in an intense magnetic field and seeing if the tracks change. If the tracks bend they are caused by charged particles, the direction of bending giving the sign of the charge, and the curvature, the energy. If the tracks are straight, the rays are either uncharged particles or else charged particles so heavy and going so fast that the field we have used cannot bend them. Experiments of this sort have been made, and show that a fair proportion of the rays going through the cloud chamber are charged, are electrons or positrons with energies of scores of millions of volts. Some of the particles, however, are either uncharged or else are charged and have energies of many millions of volts! It is lucky that only one or two of these bullets strike a square centimeter of earth's surface a minute; if they came more often our protoplasmic ancestors would have had too many disrupted chromosomes to reproduce themselves.

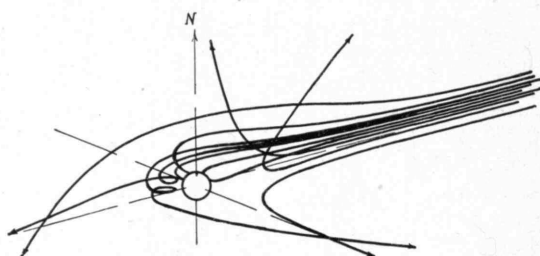
But now an annoying question arises: Are these particles whose tracks we see in the cloud chamber



Lewis Fussell, Jr., '32

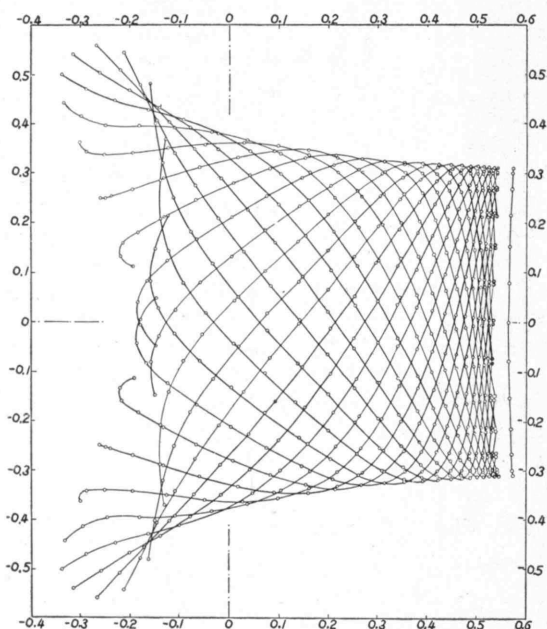
### PILGRIM'S PROGRESS

*Buffeted by magnetic fields, a cosmic ray reeled its way earthward over some such course as those suggested on the next page and landed kerplunk in the above cloud chamber where the parade was impeded by a series of lead plates creating a succession of secondary ray showers*



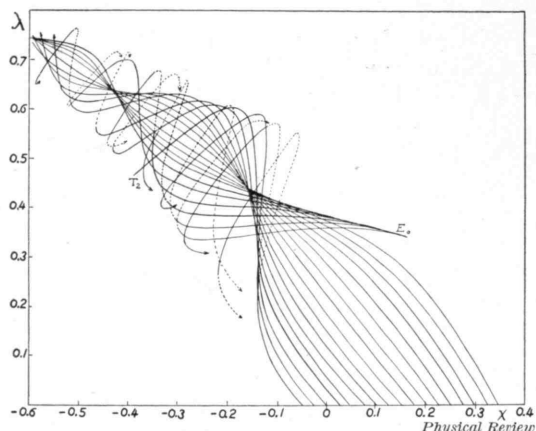
TRAFFIC DIAGRAM

... of cosmic rays as they travel through the earth's magnetic field. Some reach the earth (the circle at the intersection of the compass lines); others back up, turn cart wheels, or otherwise gambol on the magnetic green before they continue on their way. Below are shown more specific (and, you must agree, far more complex) diagrams of the paths of cosmic rays which just get to the earth. It is in the computation of such paths that one of the most significant advances has been made in unpuzzling cosmic rays



NOT TORNADOES

... do these drawings represent, but "families of asymptotic cosmic-ray paths projected on the meridian plane," to use the impeccable jargon of science. It took all of Drs. Lemaître and Vallarta's horses and the best efforts of the Institute's great differential analyzer to compute these complex paths

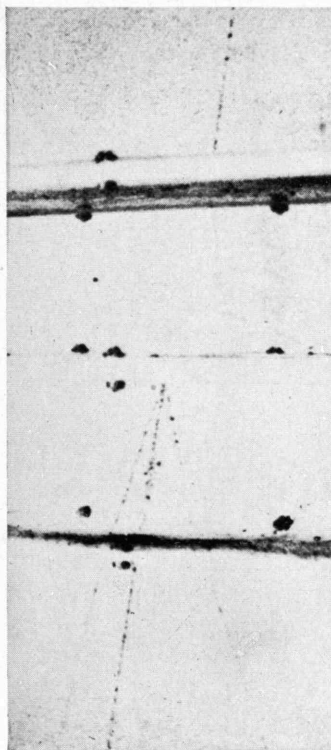


the original, primary cosmic rays or are they secondary rays, the debris of collisions occurring above us in the atmosphere? It seems inconceivable that the original rays could produce as many collisions all the way through the atmosphere as we see in the cloud chamber; it would require more than a million million electron volts originally. It seems more likely that the primary cosmic rays disrupt atoms only occasionally during their flight, say once in every several hundred feet. This corresponds to quantum theory predictions, which say that in general the faster a particle goes, the less often will it take the time to disrupt atoms in its path. The fragments from the occasional collisions are then the particles whose paths we see in the cloud chamber: Going slower than the primaries, they clip off more outside atomic electrons in their flight and eventually expend all their energy in a distance of a hundred feet or so.

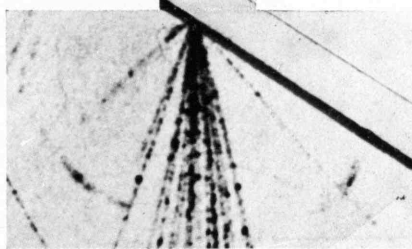
This possibility means that our measurements with the magnetic field, made on secondary rays, tell us very little about the primary rays. They tell us nothing of the electrical charge of the primaries, though they do tell us that some of the primary particles must have an energy greater than a thousand million electron volts. The measurements with the cloud chamber also tell us something of the direction of the primary rays, for it is known that the debris from a nuclear collision is carried along in the direction of the incident particle's motion. However, to find the charge and energy of the primary rays we should take our magnetic field beyond the atmosphere to make our measurements before the secondaries are formed. This difficulty has been overcome by the important work of Abbé Lemaître, '27, of Louvain, Belgium, and Professor Vallarta of the Institute, who pointed out that there is already a magnetic field ready for use outside the earth's atmosphere, i.e., the field of the earth itself. They also showed how this field could be utilized to find the properties of the primary cosmic rays. If the particles are not charged, the field would not have any, but if they are charged, the path would be twisted by the earth's field, and the results of the twist could be measured at the earth's surface.

The earth is approximately a magnetic dipole, having a field outside it similar to that which would be caused by an immensely strong bar magnet placed at a point a few hundred miles toward Midway Island from the center of the earth, with its axis nearly parallel to the earth's axis. The fundamental problem, therefore, is to compute the motions of electrically charged particles in the field of an elementary magnet, a surprisingly difficult calculation. Professor Carl Størmer at Oslo, Norway, has been working on it for a long time in connection with problems of the aurora borealis. He has shown that for some directions and for some energies, particles coming toward the earth would never reach its surface, being deflected by the earth's field long before they reached the atmosphere. However, Størmer's calculations, voluminous as they are, are far too fragmentary to enable the cosmic-ray problem to be solved. In fact, they indicate that if a blind cut-and-try method has to be followed to determine the number of cosmic rays, of different energies and from different directions, which would hit different parts of the earth's surface, then the problem is too vast to undertake.





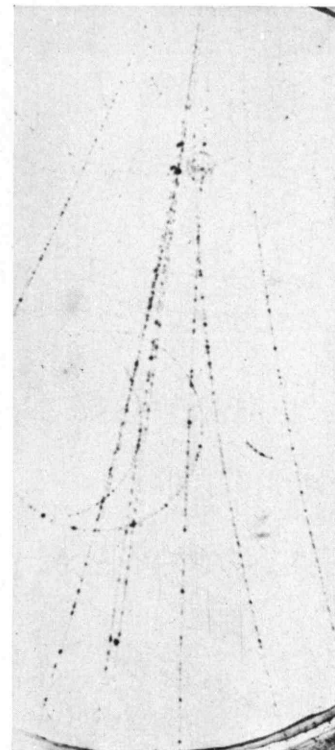
Lewis Fussell, Jr., '32



## VARIETY SHOW

Cloud chambers are stages which physicists have devised to enable cosmic and other rays to exhibit their tricks. Here assembled about are three acts of the cosmic-ray variety show as photographed by several scientific candid cameramen. (The photographs are reproduced in negative half tones.)

Above. A cosmic ray charges in from somewhere beyond the top of the page and collides with a lead plate, producing a shower of secondary rays. Left. Here, right before your eyes, a cosmic ray turns itself into a photon. It does the quick-change trick in the first lead plate, and the photon which results leaves no visible track between this and the next lead plate. The fact that the photon does penetrate this plate is evidenced by the shower it causes below. Right. In this shower, which results from the collision of a cosmic ray and a lead atom, are both positrons and electrons. A magnet off stage bends the rays into the scientifically voluptuous curves which you see



Street and Sterenson

The advance Lemaître and Vallarta made was to show that a calculation of only those paths which just get to the earth, the so-called asymptotic orbits, would suffice to determine the number of rays which strike a given spot. And then these two scientists showed how to calculate the asymptotic orbits. This improved method is still an extremely laborious one, even with the immense help provided by the differential analyzer, developed at the Institute under the direction of Vice-president Vannevar Bush, '16. We will mention only a few of the simpler results which the calculations have indicated.

A charged particle, traveling so that it will strike the earth vertically at the North or South Magnetic Pole, will not be deflected at all by the earth's magnetic field, for it does not cut across lines of force. Near the magnetic poles nearly all of the particles can reach the surface; only some of the slowest ones, coming from certain directions, will be deflected enough by the field to be warded off before they land. However, as one goes farther south from the North Pole (or north from the South Pole), the field becomes more and more efficient a protection, warding off higher and higher energy rays, from more and more directions. Finally, at the equator, only the highest can get through the magnetic shield to the earth, and these strike the earth mainly in one direction, from the west if they are positively charged, and from the east if they are negative. Therefore, measurements of cosmic-ray intensities and directions at different points on the earth tell us facts about the primary cosmic rays *even though we measure only secondaries*. For the secondary intensity must depend on the primary intensity, and the secondaries retain some of the primaries' directional characteristics. Measurements of intensity have been made in Mexico, Peru, Batavia, on the ship route between

Canada and New Zealand, and in many other parts of the earth. They show definitely that near the equator the intensity is least, that the intensity increases as we go away from the equator, until we reach about latitude 50, north or south, beyond which the intensity is practically constant clear to the poles.

These experiments, together with the theory of Lemaître and Vallarta, show that at least part of the primary cosmic rays are electrically charged particles, and since the direction near the equator is predominantly from the west, most of these are positively charged. The guess at present is that most of the rays are charged, and of the charged part at least 70% are positive. Much more voluminous and more accurate data are needed to settle this point. Reverting to the question of the origin of the rays raised earlier in this article, these results show that they come from far beyond the earth's atmosphere. Balloon measurements, which show that cosmic-ray intensity increases toward the outer edge of the atmosphere, also indicate that the rays come from outside. Since there is very little daily fluctuation of intensity, the indications are that they come from far outside the solar system. These important results have been supplemented by a number of subsidiary results which very beautifully vindicate even the finer details of the Lemaître-Vallarta theory. For instance, since the equivalent magnet is not exactly at the center of the earth, there should be a little lopsidedness to the intensity measurements around the equator — and sure enough the intensity does depend on longitude, to just about the amount predicted by theory.

Finally, as an example of the way cosmic rays can be used to "see" beyond the earth, we can mention Professor Vallarta's recent work (*Continued on page 366*)



## *"Pictorial" and "Basic" Photography*

FROM the Fourth International Salon, held in New York this spring, of the Pictorial Photographers of America, The Review selected five photographs for reproduction in this issue: the two reproduced adjacently, that on the cover, and those on pages 328 and 344.

The salon, which celebrated the 20th anniversary of the Pictorial Photographers of America, divided its pictures into two main categories — pictorial and basic (modern). The two photographs shown here fall in the first group — those which embody, to a degree, the attitude of the painter. The pictorial photographer uses photography as a means of making interesting and beautiful pictures, as a medium for telling a story or arousing a sentiment. Basic photographers, as defined by the salon's catalogue, are

devoted to photography as a medium of visual expression in its own right. They look upon it as a means not primarily to tell a story but to present a faithful record of the scene photographed with due attention on the one hand to form, detail, and texture and on the other, to those elements of selection, composition, and quality which must characterize any work of art.

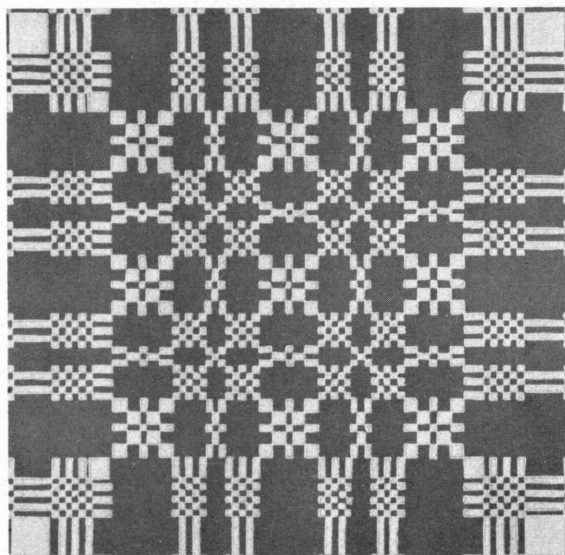
Other groups segregated by the salon were: (1) illustration, advertising, and publicity (R.C.A. Building, page 328), (2) architecture, (3) press, (4) science, and (5) natural history (see cover).

"Daisy and Honeysuckle" shown above was taken by Edward W. Quigley of Philadelphia, and "Morning Wind," (opposite) by M. Neumüller of Linz, Austria.









#### INSOMNIACS

... who study the pattern of their bedroom wallpaper may not believe it but there are only 17 different ways in which the basic design can be repeated on the paper. Reproduced at the left is a section of a standard wallpaper illustrating one pattern, as well as one of the unit cells described in the text. The pattern of this paper is one (Fig. 19) of the 17 patterns shown on pages 340 and 341

# Wallpaper and Atoms

## *How a Study of Nature's Crystal Patterns Aids Scientist and Artist*

BY M. J. BUERGER AND J. S. LUKESH

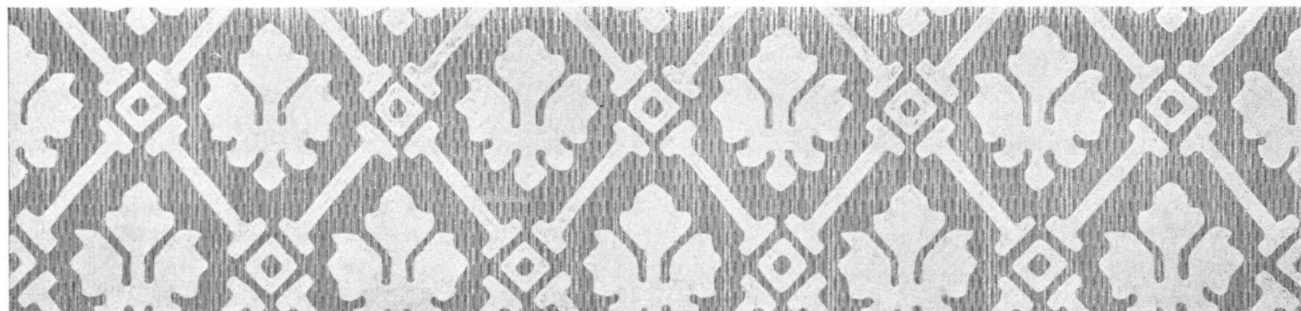
ANY possible connection between wallpaper and crystals would appear, offhand, to be quite remote. Actually, wallpaper and crystals are pattern analogues in different dimensions. In the first case, the pattern is repeated in a two-dimensional plane and, in the second, it is repeated in our three-dimensional space. Indeed, one might think of a crystal as a three-dimensional wallpaper with an atomic motif; in wallpaper the pattern repeats a motif which is a figment of the artist's imagination, whereas in a crystal the motif is a cluster of atoms representing the chemistry of the crystalline compound.

Any systematic study of either wallpaper or crystals is a study of pattern theory. The two-dimensional pattern theory is naturally much less complicated than three-dimensional theory, and students of crystal structure

DESIGNERS OF WALLPAPER, LINOLEUM, TILING, AND TEXTILES CAN PROFIT FROM THE PATTERN THEORY DEVELOPED BY CRYSTALLOGRAPHERS

profit by studying wallpaper where the essential principles of their science are illustrated in relatively simple form. A student of crystallography is thus somewhat of a wallpaper expert.

Two-dimensional patterns are, of course, by no means confined to wallpaper. They may be found in tiling, in the weaves of textiles, and in the prints on linoleum, carpets, and dress goods. If the reader will but glance at his necktie, he will doubtless find there a pattern which he can classify by comparison with one of the types illustrated herewith. Once some of the interesting features of patterns have been called to his attention, he will begin to recognize patterns as forming an important part of his everyday environment, and he will probably often accept the mental challenge to analyze and classify these.



#### A CRYSTAL

... might be considered a kind of three-dimensional wallpaper with an atomic motif. The wallpaper above is pattern  $C_{1, Cl}^{III}$  (Fig. 13) shown on page 340



FIG. 2

FIG. 1a



FIG. 1b



### THE PATTERN DESIGNER

... uses these operations, repetitions, and coordinate systems in manipulating his motifs. By utilizing these in different ways he may get the 17 (but only 17) patterns shown on the next two pages. Designers should be familiar with the analytical approach to patterns, developed in this article

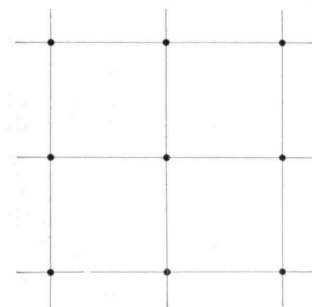


FIG. 7

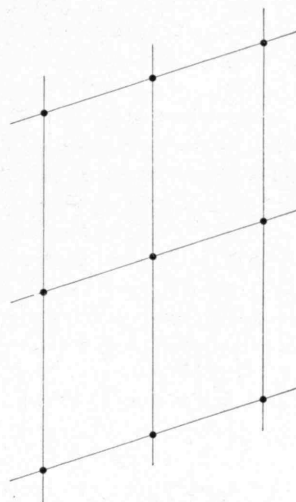


FIG. 3

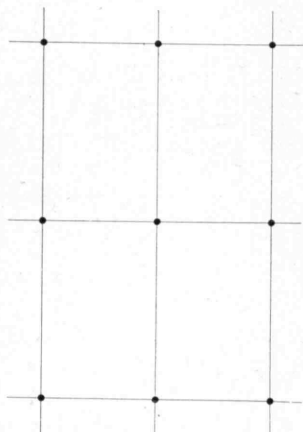


FIG. 4

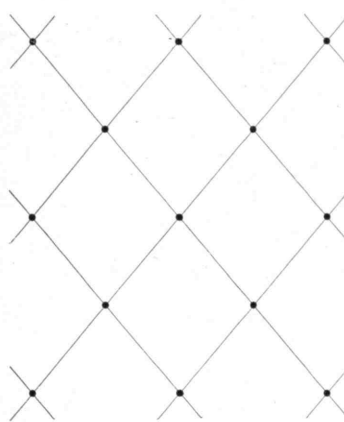


FIG. 5

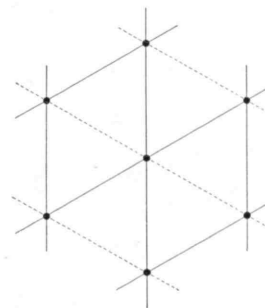


FIG. 6

Only five coordinate systems (called lattices) can be found for patterns and the adjacent drawings show them

One of the interesting and fundamental things about patterns is that there are a limited number of types: only 17 in two dimensions and only 230 in three dimensions. This means that there are only 17 distinct kinds of wallpaper patterns and only 230 distinct kinds of crystal patterns. This situation may appear surprising, especially when one reflects that he has certainly seen more than 17 varieties of wallpaper, whether good, bad, or indifferent; the statement means, however, that there are only 17 different ways of repeating a given motif in a plane and only 230, in space.

The rigorous derivation of the 17 plane pattern types would be quite beyond the scope of this article, but the basis upon which the derivations are made may be appreciated easily. In the illustrations of plane patterns accompanying this article, we have arbitrarily chosen a comma as representing the motif, but any motif whatever could be thrown into the pattern type and repeated. Now, asymmetrical figures such as commas occur in two varieties of the same shape: "rights," or right-handed commas (with their tails pointed clockwise, say), and "lefts," or left-handed commas (with their tails pointed counterclockwise, according to this convention). Any right may be repeated as a right by placing it in some other position in the plane. Analyzed into its geometrical movements — Fig. 1a — this amounts to translating the right-handed comma to another position, at the same time rotating it through a certain angle,  $\alpha$ . Any right-handed plane figure can be repeated to any other position and orientation in the plane by means of this combined translation-rotation movement. If the right-handed comma is to be repeated to become a left-handed

comma, however, it must undergo an additional operation to change it from a right to a left. Accordingly, a right repeats to a left — Fig. 1b — by a combination of a translation, a reflection across a line, and a rotation to the required orientation.

A number of permissible special cases of these repeating movements are standard repeating *operations*. These include: (a) the translation alone (with no rotation or reflection); (b) the rotation alone through an angle,  $\alpha$  (with no translation or rotation); (c) the reflection alone (with no translation or rotation); (d) the combination of reflection and translation together, known as a *glide reflection*. These operations provide repetitions of the type illustrated in Fig. 2 (a, b, c, and d). Note that the rotation angle of Fig. 2b must be an aliquot part of 360 degrees; otherwise the remainder of the 360 degrees would constitute a second angular repetition not consistent with the original required repetition angle.

These four operation types may be combined with one another to produce complicated repetition patterns, and if the combining be done systematically, there will result the total number of ways of repeating a given motif in a plane. The combining may be done intuitively, but it can be accomplished with greater rigor and ease with the aid of the mathematicians' *group theory*. The easiest way of starting the combinations is to combine the translations with each other first. This is not only a simple way of investigating repetition combinations, but it leads, as we shall see, to frameworks of fundamental importance. This is true partly because, even if the pattern has no other repeating mechanism, it must have translations in order to be an extended pattern.



FIG. 9  $C_1^I, P1$

FIG. 10  $C_2^I, P2$



FIG. 11  $C_1^I, P1$

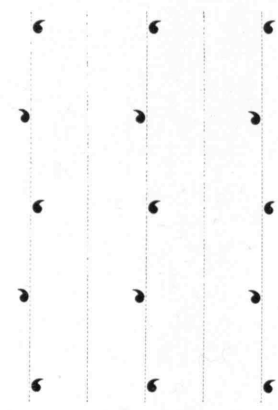


FIG. 12  $C_1^{II}, P6$

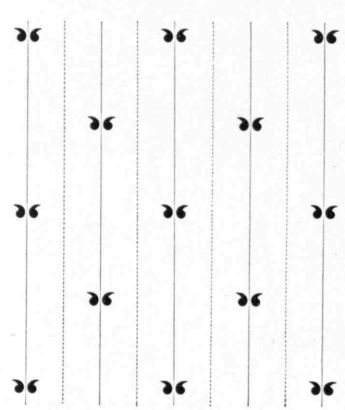


FIG. 13  $C_1^{III}, C1$



FIG. 14  $C_{2I}^I, P11$



FIG. 15  $C_{2I}^{II}, P6a$

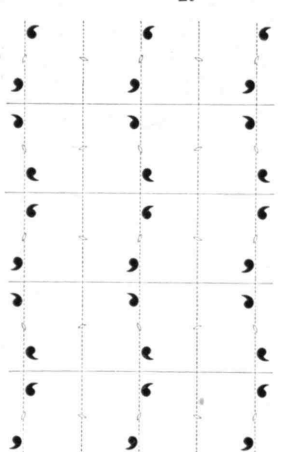


FIG. 16  $C_{2I}^{III}, P6l$

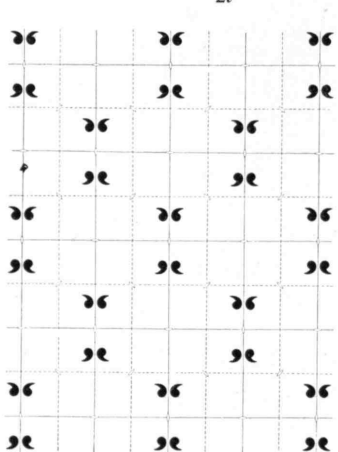


FIG. 17  $C_{2I}^{IV}, C11$

FIG. 8

Key to the symbols used in these pattern types. The comma represents the repeated motif; the other lines and symbols, explained in the text, simply draw attention to the symmetry of the patterns and are called the elements of symmetry

- 2-fold rotors
- △ 3-fold rotors
- 4-fold rotors
- 6-fold rotors
- reflection line
- glide-reflection line
- “ pattern motif

## THE 17

... distinct kinds of wallpaper or plane patterns are shown on this and the opposite page. Try to find in these 17 drawings the repeat patterns in your wallpaper or linoleum. Add another dimension (making three, as in a crystal) and the number of pattern types leaps from 17 to the staggering total of 230. The scientist must deal with this large number of patterns in studying the distribution of atoms in solid matter — a fertile field of investigation as explained in the April Review

Suppose that we have a sheet of square-ruled graph paper. If we have an object at the origin and wish to repeat it at each ruling intersection, this can be done by translating the object to the coordinate points:

	(0,3)	(1,3)	(2,3)	(3,3)
	(0,2)	(1,2)	(2,2)	(3,2)
	(0,1)	(1,1)	(2,1)	(3,1)
	origin	(1,0)	(2,0)	(3,0)
y ↑	x →			

The operations of doing this are combinations of the translation vectors,  $mx$  and  $ny$ , where  $m$  and  $n$  are any and all integers and  $x$  and  $y$  are the unit distances between rulings on the graph paper. The graph-paper rulings therefore represent the combinations of the two translations necessary to repeat a figure in a plane, and the ruling intersections represent the positions of the repeated motif.

A coordinate system of this sort is at the basis of every pattern, but it is not always so specialized as square-ruled graph paper. The general coordinate system of the general pattern is the unspecialized network of lines shown in Fig. 3. Now if this unspecialized network of translations be combined with the other operations — b, c, and d — mentioned above and illustrated in Fig. 2, a number of interesting limitations to combinations develop. In the first place, it turns out that only four kinds of angular repetition operations, called *rotors*, are consistent with the translation nets (i.e., with extended patterns), namely, rotors which repeat the motif about the rotor point at angles of 180 degrees, 120 degrees, 90 degrees, and 60 degrees (known as 2-fold, 3-fold, 4-fold, and 6-fold rotors, respectively, because they repeat the motif two, three, four, and six times about



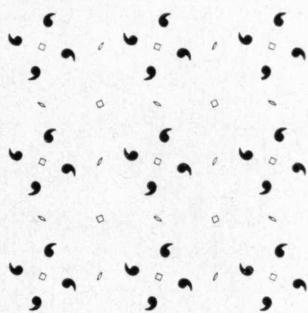


FIG. 18  $C_4^I, P4$

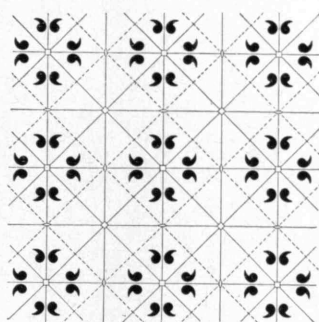


FIG. 19  $C_{4l}^I, P4l$

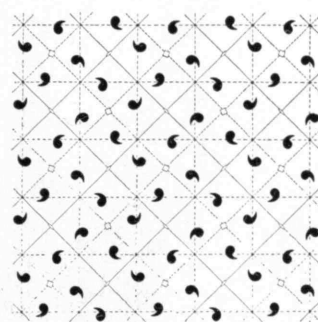


FIG. 20  $C_{4l}^{II}, P4b$

the point). This limitation simplifies the labor of combining operations. In the second place, it turns out that if the coordinate networks are made consistent with each of the symmetries or repeating operations shown in Fig. 22, that only five specialized net types develop. These are illustrated in Figs. 3, 4, 5, 6, and 7. They are known as parallelogram, rectangular, diamond, equilateral-triangular (or hexagonal), and square nets, respectively. These pattern-coordinate systems or translation nets are known technically as *lattices*: Figs. 3 to 7 show the five possible plane lattices. (In space there are 14 specialized varieties.)

Now, if the 2-fold rotors, 3-fold rotors, 4-fold rotors, 6-fold rotors, reflection lines, and glide lines are systematically combined with the five appropriate lattices, there result 17 combinations of repeating operations. These are illustrated in Figs. 9 to 25. These 17 illustrations completely limit the possible wallpaper patterns and other repeating plane patterns. The key to the symbols used in these pattern types is shown in Fig. 8. The comma represents the repeated motif; the other lines and symbols simply draw attention to the symmetry of the patterns and are known as the elements of symmetry. These include the four kinds of points (rotors) about which the commas repeat in angular repetition. Across the full lines the entire pattern is reflected, and across the dashed lines the pattern is reflected then displaced by half a translation interval. These lines are known as *reflection lines* and *glide lines*, respectively.

The pattern types are referred to by a pattern symbol, of which two kinds are in current use; both are given below each pattern. The first symbol is of the form  $C_{2l}^{III}$ ; the subscript number gives the "fold" of the rotor, and, if any line of symmetry is present in the pattern, this is indicated by a following subscript,  $l$ . The superscript is an arbitrary designation of the combination number — the combination differing according as reflection lines, glide lines, or both are present in the pattern having the subscript characteristics. The second form

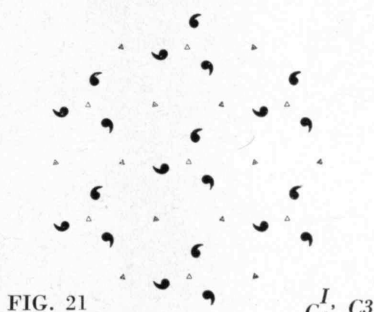


FIG. 21

$C_3^I, C3$

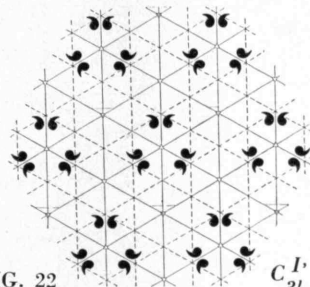


FIG. 22

$C_{3l}^I, C3l$

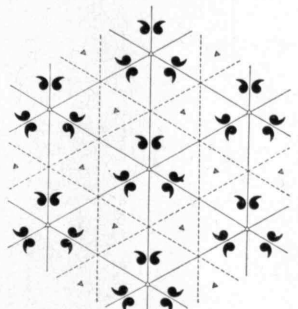


FIG. 23

$C_{3l}^{II}, H3l$



FIG. 24

$C_6^I, C6$

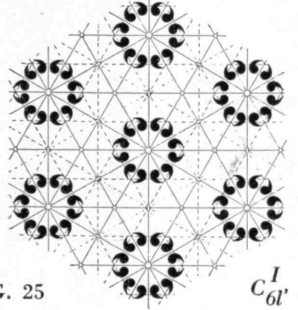


FIG. 25

$C_{6l}^I, C6l$

of symbol — of the type  $P2$  or  $P6l$  — reveals, in the symbols following the capital letter, just what important characteristic symmetry elements may be found in the pattern.

The key to such symbols is:  $P$  equals primitive lattice;  $C$ , centered rectangular lattice, which equals also diamond lattice referred to an orthogonal coordinate system;  $H$ , hexagonal lattice; 2, 3, 4, 6, respectively 2-, 3-, 4-, and 6-fold rotors;  $l$ , reflection line;  $a$ , glide-reflection line with gliding component parallel with the  $a$  axis;  $b$ , glide-reflection line with gliding component parallel with the  $b$  axis. Here the  $a$  axis of the figures runs left and right, while the  $b$  axis is vertical. The symbols indicate only enough of the symmetry of a pattern to identify it.

One of the interesting features about patterns is that they can be blocked out into small domains called *unit cells*, each constituting a limited motif complex. A unit cell is that portion of a pattern which, when repeated by the translations alone, develops the entire pattern. Thus, if a rubber stamp be constructed to make an impression of the contents of a unit cell, the repeated impression of the stamp at appropriate intervals in two directions serves to construct the pattern. The appropriate intervals, of course, are the lattice translations for the particular pattern in question. Therefore, if an intersection point of the net be chosen as the origin of coordinates of the unit cell and if a rubber stamp be made which prints the cell contents, then the repeated impression of the stamp, placed with its origin at each of the net intersections reproduces the entire pattern.

These lattices form the natural coordinate systems to which the analytical geometry of the pattern may be referred. It is one of the peculiarities of patterns and, of course, of crystals that the easiest coordinate system is the lattice of the pattern involved. If an ordinary square-coordinate system be used in connection with a pattern based upon a parallelogram-type lattice, for example, the analytical study of the pattern becomes highly difficult. The same is true in familiar situations which we do not customarily regard as patterns but which,

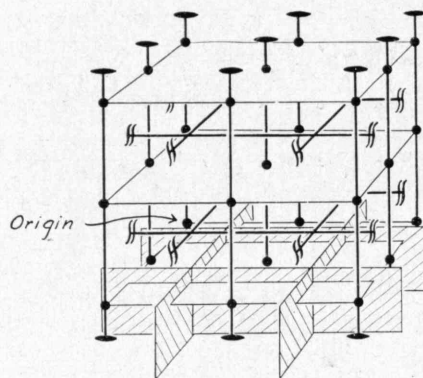
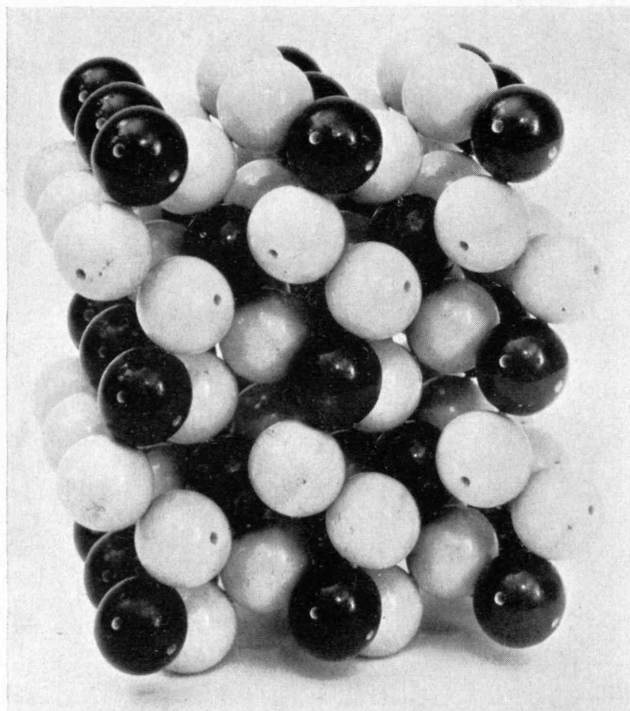


FIG. 26

The drawing shows the symmetry elements of a three-dimensional crystal pattern — one of the 230 possible patterns. The photograph shows an actual atomic model based on this same pattern. Both drawing and model were deduced from data obtained with the remarkably powerful pattern-analysis instruments shown below

nevertheless, have pattern characteristics. The block system of locating a house on a city street is an instance. No matter what the shape of the block, we customarily direct a stranger to a house by telling him to go so many blocks along a certain street, then so many blocks along a certain avenue. Whatever the inequality in lengths of blocks along street and avenue, one speaks of them as blocks, regardless, for they form the natural coordinate system or latticework of the city.

#### ONE TEN-TRILLIONTH

Wallpaper patterns may be seen with the eye and are thus easily analyzed. Atomic patterns in crystals can be detected only by powerful instruments such as those shown adjacently. At the right Professor Buerger is operating an atomic-pattern analyzer which reveals in which one of the possible 230 patterns atoms congregate in the crystal. Another instrument locates so strategically the spots produced in the diffraction of x-rays by a crystal that computations based on these measurements yield spectacular results. By measuring (as below) to only one five-hundredth of an inch on the film produced by the machine, computations give atomic distances as tiny as one ten-trillionth of an inch



Returning to the patterns themselves, one may ask: "If the pattern types are fixed, what is the function of the artist in pattern design?" His is mainly the duty of fixing the arbitrary constants of the problem. He can: (1) select a type from the 17 possible patterns; (2) fix upon the scale of the pattern, *i.e.*, fix the magnitudes of the two translations of the lattice and the angle between them, or fix as many of these as the pattern symmetry leaves unfixed (only the [Concluded on page 370])

# Housing and Community Planning

## Collateral Reading for the Housing Conference, "Homes of Tomorrow," at M.I.T. on June 7

COMPILED BY FLORENCE W. STILES

A selected bibliography of books available in the Library, School of Architecture, M.I.T. Reprints of this reading list may be obtained without cost by applying to The Technology Review, Cambridge, Mass.

### General

ARONOVICI, CAROL and E. MCCALMONT. *Catching up with housing*. Beneficial Management Corporation, 1936.

"The first brief but comprehensive résumé of housing facts. . . . There is a valuable appendix containing lists of Federal housing projects and enabling laws by states, a glossary of terms, and, finally . . . a bibliography of the latest housing material." — *American City*.

BAUER, CATHERINE. *Modern housing*. Houghton, Mifflin, 1934. Noteworthy for the chapter on minimum standards in practice and some 50 plates of representative examples of European and American housing.

BEMIS, ALBERT F., '93, and JOHN BURCHARD, '23. *The evolving house*. Volume I, *A history of the home*; Volume II, *Economics of shelter*; Volume III, *Rational design*. Technology Press, 1933 to 1936.

"The general purpose of this three-part work is to deal with one of the fundamental features of human existence — housing, or shelter." — *Foreword*.

HARDY, CHARLES O. *Housing program of the city of Vienna*. Brookings Institution, 1934.

"A description of the progress in municipal housing made in Vienna under the 15 years of control by the Social Democratic party. . . . Included are discussions of the pre-War and early post-War situations, the political background, the municipal building program and its major projects, 1919 to 1923, together with its financial aspects and administration. Building codes and special requirements regarding light and air are given in appendices." — *Journal of Home Economics*.

INTERNATIONAL HOUSING AND TOWN PLANNING CONGRESS, 14TH, London, 1935. Part I, *Papers and general reports*; Part II, *Report*. International Federation for Housing and Town Planning, 1935.

KNOWLES, MORRIS. *Industrial housing: with discussion of accompanying activities; such as town planning, street systems*. . . . McGraw-Hill, 1920.

"Illustrations and charts, a good bibliography, and an analytical index complete its usefulness." — New York Public Library *Municipal Reference Library Notes*.

NATIONAL ASSOCIATION OF HOUSING OFFICIALS. *Housing officials' yearbook*. Association, 1935.

"In preparing its first annual publication, the National Association of Housing Officials has tried to assemble authoritative accounts of the powers, activities, programs, difficulties, and accomplishments of the major governmental agencies directly concerned with the provision of low-cost housing." — *Foreword*.

NATIONAL ASSOCIATION OF HOUSING OFFICIALS. *Housing officials' yearbook*. Association, 1936.

"Contains . . . a section on the eight Federal housing agencies, including the Central Housing Committee, their new coordinating medium, and the housing adviser of the Treasury Department. . . . New features of the greatest current value, however, are the tabulations of state laws and the reference directories of official and semiofficial agencies. . . . The most important reference tool on housing that we have." — New York Public Library *Municipal Reference Library Notes*.

NATIONAL ASSOCIATION OF HOUSING OFFICIALS. *Housing program for the United States*. Association, 1934.

" . . . A guide for a long-term housing program in the United States. The product of a conference of distinguished European and American housing experts, it deals with administrative policies and with housing finance, design, management, and planning." — *Housing Officials' Yearbook*, 1935.

NOLEN, JOHN. *New towns for old; achievements in civic improvement in some American small towns and neighborhoods*. Marshall Jones, 1927.

"Mr. Nolen has written an interesting and suggestive little book on the improvement of existing small towns and the creation of new ones, the latter either as suburbs of large cities or as entirely new industrial or resort communities. . . . Among specific recent examples are the reshaping of Walpole, Mass., into an industrial town, the creation of the new industrial town of Kingsport, Tenn., and the building of Mariemont, Ohio, as an overflow and escape for dwellers in Cincinnati." — *Engineering News-Record*.

PRESIDENT'S CONFERENCE ON HOME BUILDING AND HOME OWNERSHIP, Washington, D. C., 1931. *Final reports of committees*, edited by J. M. Gries and James Ford, in 11 volumes. Conference, 1932.

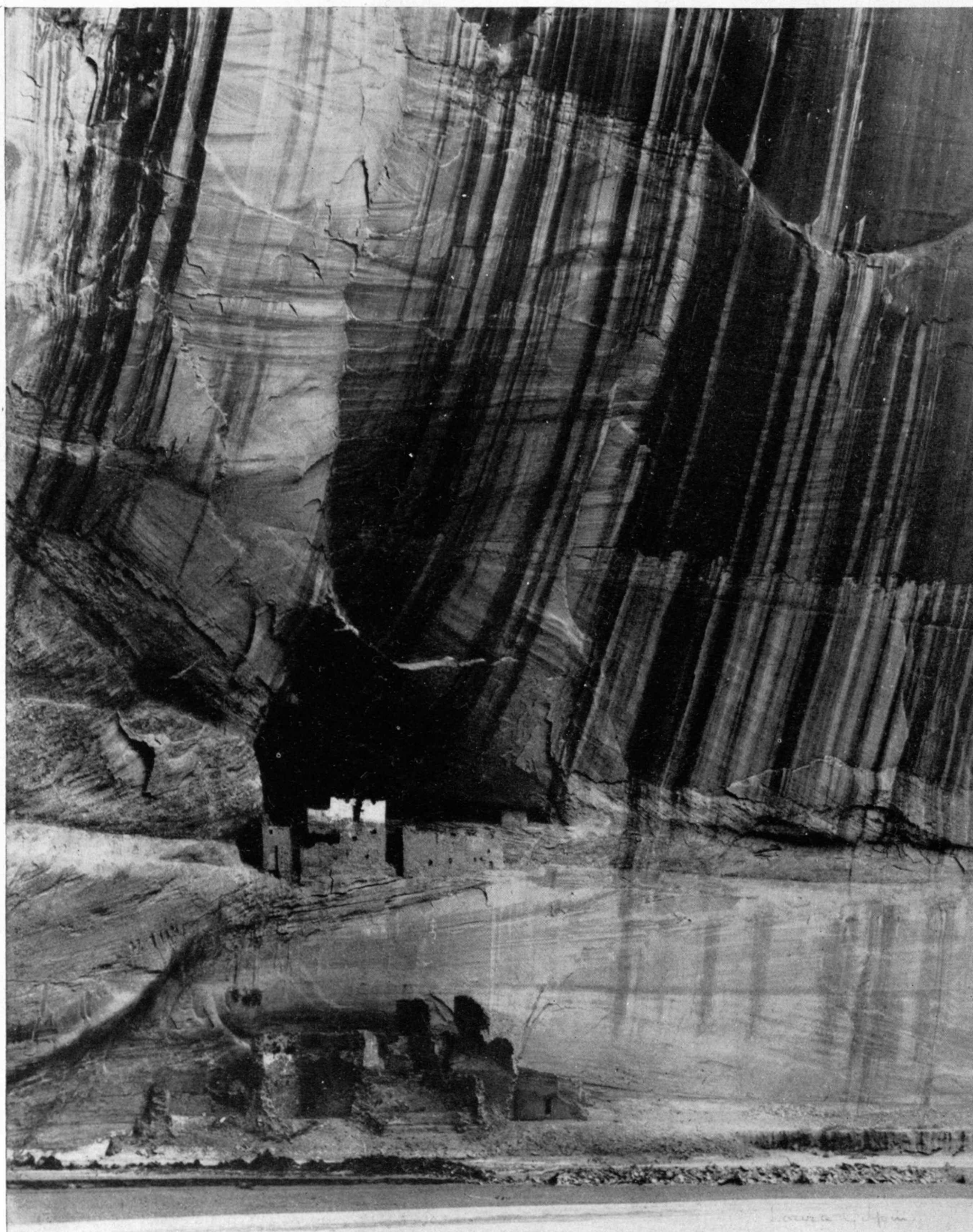
"Of special significance is the development of the idea of the neighborhood unit." — *Introduction*.

SCHWAN, BRUNO. *Town planning and housing throughout the world*. Wasmuth, 1935.

"It offers a survey over the development, the present status, and the legislation in matters of town planning and housing in the chief cultural countries of the world and demonstrates the respective performances in many pictures, partly not published so far. . . . The volume appears in three languages, in order to make it available for all interested persons in the whole world." — *Preface*.

STEIN, CLARENCE S. *An outline for community housing procedure*. Reprinted from *Architectural Forum*, March-May, 1932.





*Fourth International Salon, Pictorial Photographers of America*

## HOMES OF YESTERDAY: CLIFF DWELLER'S STYLE

*From a photograph, "Canyon de Chelly," by Laura Gilpin*

In Arizona's superb Canyon de Chelly stand these ruins of pueblo housing sheltered by a magnificent canopy of red sandstone striped with black and gray. Occupied subsequent to the 16th Century, this most striking of the canyon's cliff dwellings has been named Casa Blanca, or White House

UNITED STATES FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS. Housing Division. Bulletin Number 2, *Urban housing: the story of the PWA, Housing Division, 1933 to 1936*. Government Printing Office, 1936.

### *Social and Economic Factors*

ABBOTT, EDITH. *Tenements of Chicago, 1908 to 1935*. University of Chicago Press, 1936. Maps and illustrations.

"This volume on the history, development, and present condition of the tenement areas of Chicago is the result of a series of studies made over a period of approximately 25 years in different sections of the city by members of the faculty and groups of graduate students in the School of Social Service Administration." — *Preface*.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE. *Current developments in housing: A discussion designed to contribute to a better understanding of the factors involved in achieving adequate housing for all economic groups*. Academy, 1937. (*Annals*, No. 190.)

BEMIS, ALBERT F., '93. *The evolving house*. Volume II, *Economics of shelter*. Technology Press, 1934.

"Closely reasoned throughout and must be regarded as a source book rather than as offering a panacea for our present ills, although Mr. Bemis apparently finds, as have many other intelligent observers, that eventually we must come more and more to standardized construction." — Aymar Embury, 2d, in *Saturday Review of Literature*.

FORD, JAMES. *Slums and housing, with special reference to New York City: history, conditions, policy*. Harvard University Press, 1936. 2 volumes.

The second volume contains a bibliography of housing in New York City and a bibliography of housing bibliographies. "A study, dealing primarily with New York's housing problem and its history, with an exhaustive treatment of the slum, its exact definition, causes, social and economic consequences, and physical characteristics. It reviews almost every type of housing endeavor, including the European projects." — *Architectural Forum*.

FORTUNE. *Housing America*. By the editors of *Fortune*. Harcourt, Brace, 1932.

GIST, NOEL P., and L. A. HALBERT. *Urban society*. Crowell, 1933.

"Although not an original treatise from the standpoint of research, it does represent an attempt to synthesize existing data and analyses, and to provide an interpretation of city life that will throw additional light on the phenomenon of urbanism. The data have been interpreted less as a series of problems than as social processes descriptive of the organization of city life. These changing social relationships, by their very nature, give birth to social problems, which in the end necessitate new procedures and new forms of organization." — Edwin S. Burdell, '20, in *The Planners' Journal*.

GOODRICH, CARTER, BUSHROD W. ALLIN, and others. *Migration and economic opportunity*. Wharton School of Finance and Commerce. Industrial Research Department. Study of population redistribution. University of Pennsylvania Press, 1936.

HEGEMANN, WERNER. *City planning, housing*. Volume I, *Historical and sociological*; Volume II, *Political economy and civic art*. Architectural Book Publishing Company, Inc., 1936 to 1937.

A third volume of photographs and plans is in preparation. The first two volumes "are perhaps an argument for housing as a recognized national responsibility and a discussion of the interrelationship of planning and housing." — *Planning and Civic Comment*.

LAW AND CONTEMPORARY PROBLEMS. *Low-cost housing and slum clearance*. Duke University, 1934.

"The symposium which constitutes this issue . . . has for its primary purpose the presentation of the legal problems which those engaged in the housing movement have encountered and must reckon with." — *Foreword*.

MARGOLD, S. K. *Some essential facts on government-aided housing in Western Europe*. United States Bureau of Foreign and Domestic Commerce. Government Printing Office, 1936.

UNITED STATES FEDERAL HOUSING ADMINISTRATION. *Analysis of the real property inventory and financial survey of urban housing for Peoria, Ill.* Government Printing Office, 1935.

VEILLER, L. T. *Housing reform, a hand-book for practical use in American cities*. Charities Publication Committee, 1910.

VEILLER, L. T. *A model housing law*. Survey Associates, Inc., 1914.

WHITTEN, ROBERT, and THOMAS ADAMS. *Neighborhoods of small homes; economic density of low-cost housing in America and England*. Harvard University Press, 1931. Statistical tables, maps, and explanatory data.

WOOD, EDITH E. *Slums and blighted areas in the United States*. Government Printing Office, 1935.

"Dr. Wood [a recognized authority on housing matters] especially from the sociological standpoint . . . sets forth in a convincing manner the great need for slum clearance and rehousing of the low-income groups. . . ." — Horatio B. Hackett, director of housing division.

WOOD, EDITH E. *Recent trends in American housing*. Macmillan, 1931.

"Valuable today not only as a background for understanding present housing trends, but as a source book on the legal, financial, and administrative devices (their accomplishments and their failures) that had been developed in this country prior to 1931 in an effort to meet the housing needs of the lower-income group." — *Housing Officials' Yearbook*, 1935.

### *Design and Construction*

ADAMS, THOMAS. *Design of residential areas; basic considerations, principles, and methods*. Harvard University Press, 1934.

"A great deal of valuable information has been marshaled in regard to housing and planning activities, and all those engaged in connection with them, as propagandist, administrator, or technician, should be grateful to Dr. Adams for placing at their disposal such well-documented and illustrated data." — *The Town Planning Review*.

ARCHITECTURAL FORUM. *The integrated house: a new approach to cost reduction*. Time, Inc., April, 1937.

ARCHITECTURAL FORUM. April, 1935. *Better homes in America: Report of the Jury in Annual Competition to "discover and call attention to the best small houses actually constructed and to stimulate interest in eliminating faulty design and construction."*

BEMIS, ALBERT F., '93. *The evolving house*. Volume III, *Rational design*. Technology Press, 1936.

Describes the theory of cubical modular design. The supplement, nearly one-half of the book, is devoted to the description and evaluation of the "more important efforts to design a house suited to prefabrication."

COUNCIL FOR RESEARCH ON HOUSING CONSTRUCTION. *Slum clearance and rehousing, the first report of the Council*. P. S. King, 1934.

"The Council . . . decided to confine the first stage of its specifically structural investigation (*Continued on page 372*)

# Biological Engineering

## *A New Focusing of the Sciences for the Public Weal—A New Opportunity for Young Men*

BY JOHN W. M. BUNKER

NO SERIOUS student of progress can be unaware that the several frontiers of science have long since been obliterated by goings and comings across the borders and a constantly increasing interchange of thought and technique. This pooling of knowledge and the consequent readjustment of viewpoint constitute a new and hopeful philosophy of progress through coördinated effort.

It is this philosophy that underlies Technology's educational program in the new field of biological engineering, the name selected to designate an art, still in its infancy, which comprises the use of techniques of various sciences in the study of biological problems, and the application of biological data to human welfare with the systematic method of the engineer.

The techniques of experimental physics and chemistry are being applied to the study of biology with notable success, and the greater precision of measurement and of description of biological phenomena made possible thereby is changing the character of biology from descriptive to analytic. It is only by repetition that tests of theory can establish truth, and true repetition can be effected only when reproducible precision of essential measurement characterizes the initial tests. Chemical and physical measurements in biological investigation have supplied the precision necessary for successful tests in experimental biology.

The utilization of the allied sciences for the attack upon problems of a biological nature is being accomplished at the Institute today, and with the exception of the important field of medicine, Technology probably has a more varied and a more closely knit group of scientific experts than can be found in any other organization in the world. In addition to intrastaff collaboration, it enjoys excellent coöperative relationships with neighboring medical and scientific institutions and with varied biological industries.

Within the memory of many Alumni, chemical engineering was inaugurated at the Institute as a new art, combining chemical science with engineering method in a joint attack upon industrial problems. It seems logical to believe that successful development may likewise follow a strong attempt to center here at the M.I.T. a practical approach to the attack upon biological problems—an approach which involves coöperative efforts of chemists, physicists, biologists, and other scientists and engineers, and coördinates the background of interest which already exists throughout the Institute.

The decision to develop biological engineering is not based upon the mere hope that such a development may take place. It is founded upon experience and a combi-

nation of directed coöperative effort with the spontaneous interest which has been demonstrated throughout the Institute, particularly during the last six years. Examples of the result of such effort include precise radiation measurements of the wavelengths of ultraviolet light, which are instrumental in curing rickets; the development of the electrocardiotachometer for a study of the heart rate of experimental animals in dietary deficiency diseases; an analysis of the movement of cilia of the clam with high-speed photography and stroboscopic light; and the production by irradiation of alcohol peroxides, two of which are of value in combating the ailment known as athlete's foot.

Other achievements are seen in the development of irradiated animal and vegetable oils, being tested now at several Boston hospitals, for beneficial effects on burns and other wounds which are difficult to heal; the production and identification of volatile germicidal vapors from these irradiated oils; various developments of technique in animal bio-assay of vitaminic materials; and the method of synthesizing vitamin D by bombarding the provitamin with excited gas particles in the field of a high-frequency, shortwave radio oscillator.

The problem of the relation of chlorophyll in the diet to recovery from certain types of anemia has been advanced toward its solution through the preparation of chlorophyll derivatives "chemically free" from iron or copper, with traces of the latter so minute as to require refinements of our spectroscopic laboratory in the Department of Physics to determine their presence.

The microbiology of textile fibers, including cotton, wool, and cordage fibers, has been the subject of investigation in our laboratories for several years and valuable information on this aspect of deterioration of cotton fibers has been published.

A biochemical method for the detection of improperly pasteurized milk has been developed and widely adopted by dairymen and public health enforcement officers.

Other recent achievements include new knowledge on the detoxification of snake venoms; administration of vitamins through the skin; discovery of the cause and method of prevention of slime formation on beef in storage; the careful working out of the effect of low-temperature storage on *Clostridium botulinum* in foods.

The enumeration of bacteria, molds, and spores in the upper air—at altitudes up to 17,500 feet—was made possible through the coöperating agency of airplane flights carried out by members of the staff of the meteorological service. This required the design and construction of special devices for sampling the air at high



velocities and low temperatures. The importance of this in relation to spread of plant or animal diseases through air movement is obvious.

The vitamin D increase in the breast milk of human mothers who were fed vitamin-fortified cows' milk has been measured and reported. Clinical investigations of the efficiency of vitamin milks in curing infant rickets have been conducted in collaboration with staff members of the Children's Hospital in Boston.

In the field of ecology, preliminary studies have already been carried out in this department in correlations between temperature, humidity, soil chemistry, and the life of organisms closely related to the soil. These investigations have supplemented field surveys of the distribution of certain animals of the soil. Surveys to determine the distribution of termites, for instance, in respect to climate, rainfall, soil chemistry, and the like constitute a type of biogeography.

In addition to such studies centered in the Department of Biology and Public Health, with frequent coöperation from sister departments, there are many current examples of activities related to biological engineering which have originated in other departments and are carried on there with the coöperation of the Biology Department and local hospitals. Many of these are by-products of research begun for quite different objectives, and our recent experience shows that, with attention alert to such possibilities, a continual flow of valuable contributions to biological engineering may be expected from this source.

In the Department of Chemistry successful efforts in purification of vitamin D from its natural source — fish oil — have been checked with bio-assays in the biology laboratories. This study reveals at the time of writing that a potency of over twenty-five million units per gram has been achieved from an oil which in its natural state would be expected to show 100 or 200 units. The production of water-soluble derivatives of fat-soluble vitamins A and D is also being checked biologically, and shows distinct promise of being a notable advance in vitamin technology. Progress has been made toward the synthesis of the female sex hormone.

In cancer research, carcinogenetic hydrocarbons from the Department of Chemistry are being studied in the laboratories of biology for their effect on microorganisms in the hope of establishing a test for the identification of this class of compounds, which can be completed in days instead of in months, as required in the present technique of test on animals.

In the Department of Physics there has been developed a greatly improved technique for detection and measurement of radium and of radioactive emanations in food, drugs, or other materials, including the animal and human body. In collaboration with Dr. Joseph C. Aub of the Huntington Memorial Hospital there has been worked out a method for alleviation of the condition of radium poisoning, hitherto considered an incurable pathology, and substantial degree of recovery has been effected in victims. Continuing measurement of the amounts of radium eliminated from the body has been made possible by newly developed instruments, which have made it possible also to quantitate the avenues by which radium leaves (*Continued on page 376*)

## Biological Engineering

### *A Scientist's-eye View*

IT is agreed that the work in biological engineering will be largely concerned with experimental biology, and that the means of experimentation will include the application and technique of physical and chemical measurements of energy and of reaction. *Among the types of energy likely to be utilizable are the following:*

Electromagnetic vibrations (infrared, visible, ultraviolet, x-ray, radio frequencies); radioactivity; electricity; supersonic vibrations; heat; chemical energy; magnetism.

*Among the ways in which these types of energy are likely to be involved are the following:*

Stimulation of protoplasms; induced chemical changes in organic materials once living or the product of the once living; effects on enzyme action; therapeutic effects in disease; abiotic effects on deleterious microorganisms; effects on hormones and vitamins; spectroscopic analysis; x-ray study of crystal structure; electrokinetics of cell membranes; electrophoresis of cells; mutations.

*There may be required the construction and operation of devices for securing objective measurements of changes induced as above, including also recording and measurement of:*

Temperature, pressure, humidity, air motion, gaseous relations; motion and time; amplification of feeble energies without distortion by mechanical or photonic electrical devices; radiation measurements, x-ray dosages, other radiations such as radioactivity, cosmic-ray counting, mitogenic radiation; hydrogen-ion concentration; oxidation-reduction potentials; vapor pressures; heat flow, insulation thermodynamics; surface tension; conductance and impedance in protoplasms; diffusion and osmotic effects across membranes; molecular weights and isoelectric points; colloidal phenomena; agglutination and antibody reactions; electrical potentials; Donnan equilibria; Helmholtz double-layer phenomena; axone potentials and action currents; reflex time and tropisms.

*Among the technical skills which will be useful in constructing experimental and recording apparatus the following are suggested:*

Design and construction of amplifier circuits, transformers, meters; machine-tool work, welding, hard and soft soldering, woodworking, glassworking, glass-metal seals; vacuum pumps, maintenance and measurements of high vacuums, manometry, use of McLeod gauge and other devices for measuring gas or vapor pressures; production and maintenance of uniform or varying temperatures, including cryoscopic work; thermionic, vacuum tube, thyatron circuits; scientific photography and photometry; optic measurements; radiation measurements; spectroscopy, absorption and emission spectra, extinction coefficients; spectroscopic analysis of biological materials; supersonic devices; radiation sources (electromagnetic, monochromatic, and so on); optical filters; use of the research microscope, transmitted and oblique illumination; the ultramicroscope, dark-field, quartz-lens microscope, lithium-fluoride microscope; monochromators, quartz, lithium-fluoride; gaseous conditions for same; preparation and handling of pure gases.

*Among the fields of research in pure or applied biology in which a biophysicist may find employment are:*

Medical schools; hospitals; medical and biological institutes; universities; food companies, packers, canners, bakers, shippers, and so on; manufacturers of pharmaceutical instruments or chemicals and drugs; industrial hygiene; governmental laboratories, agriculture, food, health, and standards; unforeseen outlets.

# THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

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## Patenting of Institute Inventions

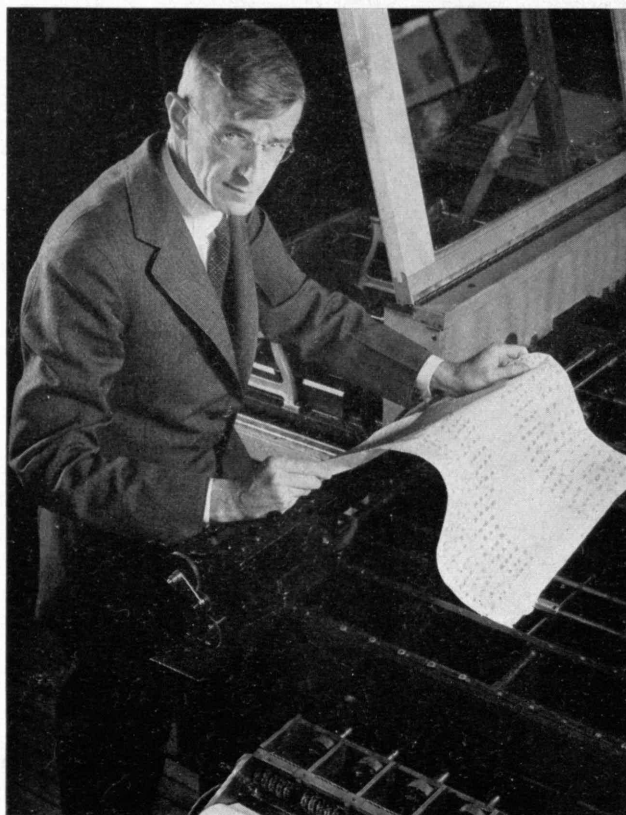
THE scientific and educational institutions of this country are faced increasingly with the necessity for careful consideration of their relationship to the patent system of the country. As a result, many institutions have in recent years made specific arrangements for dealing with this subject. The objective at Technology is and has always been to administer in a dignified and reasonable manner those inventions which inevitably arise in the course of its research.

The Institute has now had five years of experience since the adoption, by the Faculty and the Executive Committee, of a statement of patent policy regarding inventions. During this period there have been no unresolved misunderstandings and the inventions which have inevitably arisen from the research programs in the Institute laboratories have been handled smoothly and in a manner which has neither unduly distracted the research worker from his more important objectives nor brought criticism of the policies pursued. The original statement of policy, which still stands, is in the process of amplification and clarification by a patent committee of the Faculty, and merely defines the boundaries of Institute interest in inventions produced by the staff or student body. The handling of the patent applications and the relationships with industry, have been carried on by this committee itself.

Now a further step has been taken. An agreement has been entered into with Research Corporation of New York whereby this organization will handle all legal and commercial aspects of inventions assigned to it by Institute inventors. The Patent Committee of the Faculty, however, remains in existence and reviews inventions brought to its attention by the staff. Whenever an invention falls within the classification of the statement of patent policy, and appears to be of substantial potential importance, the Committee recommends to the inventor that he enter into an agreement with Research Corporation providing for patenting and commercialization. In order effectively to carry out its part in this arrangement, Research Corporation has set up a Boston office, which is in charge of Carroll L. Wilson, '32. Inventions so far handled by the Committee itself, about 30 in all, are now being transferred to Research Corporation to be handled in accordance with the new arrangement.

The completion of these arrangements has enabled the relationship of the inventor to the Institute to be worked out more definitely than has been the case before. Since the first close attention was given to this subject, it has been the announced intention of the Institute to recognize those advances in knowledge on

## The Deans of Technology's Three Schools



VANNEVAR BUSH, '16, Dean of Engineering

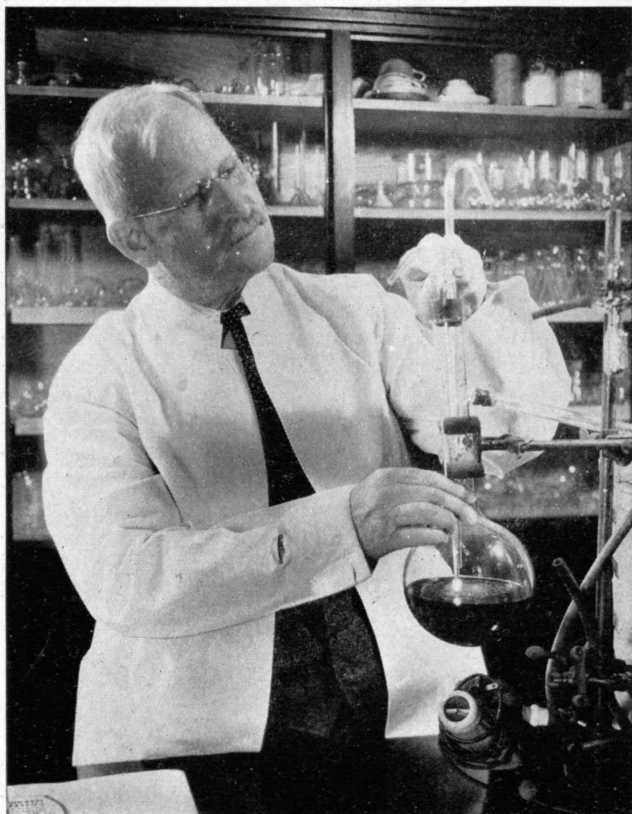
Fortune

the part of the staff which take the form of invention as legally defined, on exactly the same basis as it recognizes scientific contributions to knowledge which do not come within this category, namely, by those advances in salary and rank, and by that support of staff research activities, which are due to those whose contributions to the welfare of the Institute take this specific form. A policy based on these principles has constantly guided the Administration. In addition the Committee has felt it to be equitable that an inventor should participate directly in the proceeds of his invention, even when it arises immediately from an Institute-supported program of research. Accordingly, in the contract which it now recommends both in connection with new invention and to replace agreements under which it has handled inventions to date, there is included a provision whereby the inventor participates directly in the gross income. The balance, after expenses, is to be divided, and Research Corporation will turn the principal part of such balance over to the Institute.

The whole matter has always rested, and continues to rest, upon a basis of voluntary coöperation on the part of members of the staff. Except in the case of certain industrial research projects, the Institute does not ask its staff to enter formal agreements in regard to patent assignment, and does not intend to do so. There has been no case, however, in which any individual inventor has disagreed with the findings of the Patent Committee as to what is considered reasonable procedure in individual instances. Staff members have cordially accepted the judgment of a committee of their colleagues.

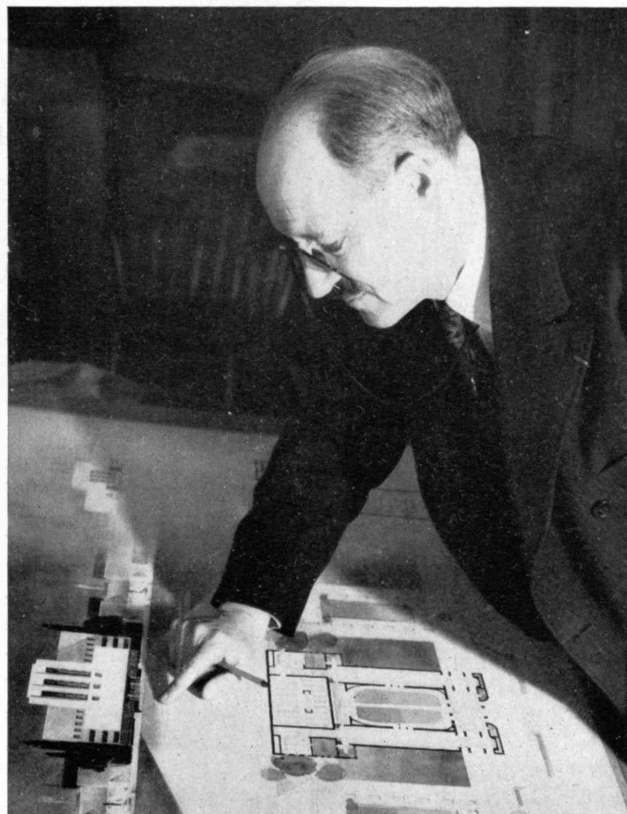
In all steps taken in the last five years in regard to the commercialization of patents, the Committee has had the primary objectives of making inventions available to industry and the public on a reasonable basis, of avoiding conditions which would lead to the unnecessary exclusion from the use of an invention of any manufacturer who qualified to use it, of avoiding situations likely to lead to litigation, and of maintaining the cordial relationship existing between the Institute and the public. The principles guiding the Committee are closely in accord with those of Research Corporation, which is natural in view of the distinguished group of men who, as directors and officers, have guided its affairs since its founding 25 years ago. These founders of Research Corporation included Edward D. Adams\*, '69, T. Coleman du Pont\*, '84, Arthur D. Little\*, '85, Elihu Thomson\*, and Charles A. Stone, '88, the present chairman of its board of directors. If there is substantial income from this source in the future, the Institute will use it for the advancement of its broad objectives: the advancement of science, aid to industry, and education of youth. Research Corporation is also a nonprofit organization and is similarly bound to use its share of possible income for the advancement of science through grants in aid of research. Thus if there should be large income in the future, after caring for expenses and inventor participation, it will return for the further support of Institute activities from which a part of it originally arose. The Institute aims to serve the public interest in many ways. The treatment of its inventions should be such that they be brought effectively and

\* Deceased.



S. C. PRESCOTT, '94, Dean of Science

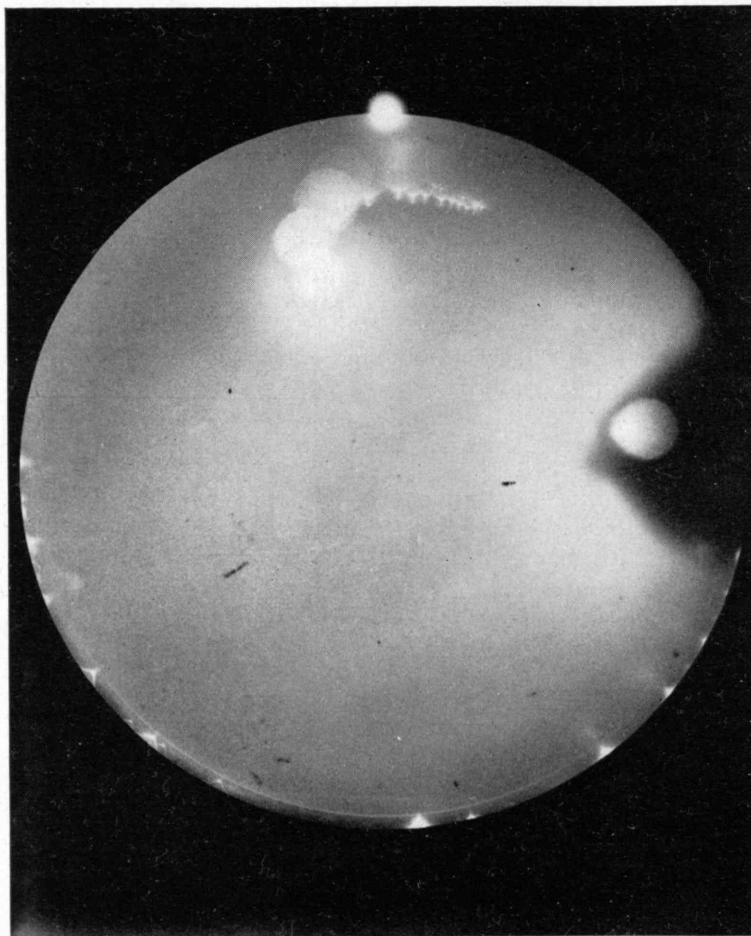
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Wm. EMERSON, Dean of Architecture

M.I.T. Photo





A WHOLE-SKY CAMERA

*... with a 180-degree lens recorded this picture of the sky at night. Around the edges of the horizon are Boston city lights, the small circle in the pie shadow on the right is the moon, and the series of bright spots in the northern, or upper zone represent successive magnesium flares. These brilliant magnesium flares, carried aloft by sounding balloons, when photographed as described below, provide a record of the velocity and direction of winds in the stratosphere*

promptly into general use under reasonable conditions and controls, in order that the public may benefit.

Relations with industry in this connection have been excellent. It remains true that when a company contributes the full support of a research within Institute walls, special agreement may provide for the assignment to that company of inventions resulting therefrom. Such closed or confidential research projects are now rare, largely because staff and facilities are occupied primarily with a broader type of cooperative research with industry, to which both the Institute and the industry contribute. Such research becomes essentially a part of the educational procedure as a means of training advanced students, and a part of a stimulating atmosphere of advancement. The agreement for this type of cooperative research will also provide, ordinarily, for special handling of any inventions which may arise therefrom. A third form of relationship with industry occurs in the consulting activities of staff members. The handling of inventions arising in such connections is provided for in the usual code of ethics of consulting engineers. Finally there is the case where, entirely

without formal agreement, a commercial company contributes substantially to the work of a particular laboratory, from which arises an invention of interest to the company. The Patent Committee has cared for this contingency by taking the stand that in such cases the contributing company is entitled to a license for its own purposes without further consideration, and it will so recommend when the facts of the situation warrant.

More important than the formalities of the situation, however, is the general attitude of industry. This is indicated by the record. Since the patent policy went into effect, there has been a continued and increasing cooperation between industry and the Institute staff, both in formal ways and in those informal contacts which are helpful and stimulating to both. Part of this is no doubt due to the fact that the industrial and institutional research men now visit one another's laboratories without embarrassment, realizing that in both cases there is provision for prompt and systematic handling of the subject of inventions as they arise.

The effect of a patent policy upon the Institute's relationships with the public has had long and serious attention. It has been questioned at times whether the existence of such a policy might not render individuals less willing to support Institute programs of research. This has certainly not occurred; support of research programs has been generous, and not one of the contributors has criticized the presence of the system. Furthermore, the present arrangement is entirely consistent with the general principles unanimously recommended by the committee on patent policy of the National Research Council after long study and consultation with leaders of thought and administration in the univer-

sities, professions, research institutes, and industry.

The Patent Committee has, from the outset, been keenly alive to the dangers which are inherent and cannot be truly avoided in our institution where important inventions arise inevitably. The dangers are avoided least of all by ignoring the presence of the problem. This is the negative aspect of the subject. The positive side is much more important. A smoothly operating, equitable system will facilitate the development and utilization of these inventions and thus implement a decidedly potent aspect of the activity of the Institute staff by bringing the results of its scientific and technical research to the furtherance of industry, and thus increasing the standard of living of the people of the country.

### Charting the Winds

**B**ECAUSE there are few problems of research in which the versatile camera has not proved a helpful and accurate tool, it is not surprising to learn that a photographic method of charting the night winds that

blow high above the earth has been devised. The butcher, the baker, and the candlestick maker are interested only in the surface winds, but the aviator and meteorologist are more interested in wind currents in the stratosphere.

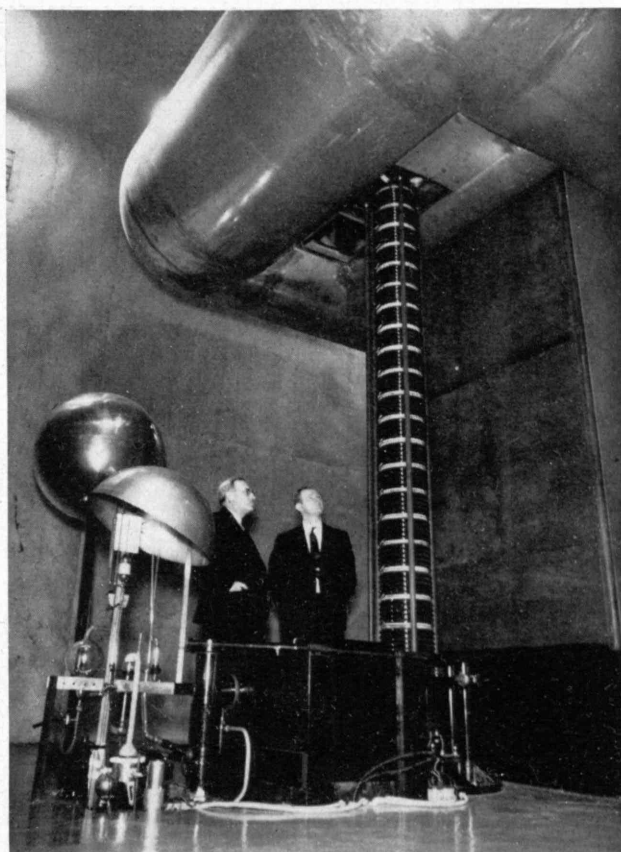
Seeking an accurate and simple method of making nocturnal soundings, Athelstan F. Spilhaus, '33, of the Woods Hole Oceanographic Institute, found time, while engaged in research at Technology, to work out a system which is not only precise but surprisingly simple. The method makes use of a "whole-sky camera," which has a 180-degree lens; a pilot balloon; and magnesium flares attached at intervals to a length of ordinary blasting fuse. From an observation point on the earth, the camera lens is pointed upward and as the sounding balloon ascends, the flashes of the magnesium flares, ignited at known intervals, are recorded. The photograph taken by the 180-degree camera is circular, the circumference depicting the horizon all around. The brilliant magnesium flashes, therefore, are registered on the plate regardless of the direction in which the balloon moves. By measuring the angles of elevation and direction between the camera station and the flashes, and correlating these data with the rate of ascent of the pilot balloon, an accurate record of the wind velocity and direction is obtained.

The usual method of measuring winds of the upper atmosphere, which often blow in the opposite direction from the surface winds, is to release a hydrogen-filled pilot balloon and follow its course by means of a theodolite on which the angles of elevation and direction are read every half minute or minute. At night it has been the practice to suspend from the balloon a paper lantern containing a candle and to train a theodolite on the light. The disadvantages of this method, however, are that the light is extremely dim and is frequently lost in a short time. Observers have also been known to confuse the faint light of the lantern with stars. The Spilhaus method makes it possible to take readings photographically at very brief intervals, and the apparatus may be used by inexperienced observers. All that is necessary is to open the shutter of the camera and release the sounding balloon after lighting the fuse to which the magnesium flares are attached for any desired flash interval. Tests of the new method have been carried on for several weeks through the coöperation of the Dewey and Almy Chemical Company, which supplied a new type of sounding balloon. Test plates have been made for recording the magnesium flashes at distances of as much as seven miles and at heights of over 13,000 feet. It is expected this height can be exceeded.

In the field of meteorological research the Spilhaus method of nocturnal soundings will provide a means of making detailed studies of the structure of the winds. The intervals of observation for such investigations can be reduced to five seconds, an interval far too brief for theodolite observations.

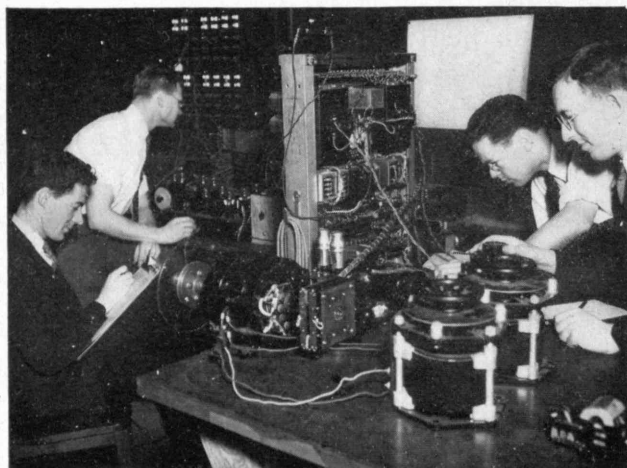
### Laboratory Paradox

SOME of the striking discoveries of research have been the result of studies which had entirely different objectives. An example of one of these paradoxical



*In April M.I.T. engineers formally turned over to the Huntington Memorial Hospital in Boston this Gargantuan x-ray machine. Above on the left is Dr. Dresser of the hospital talking with Dr. Trump of the Institute, designer of the equipment. Below, in the pleasant treatment room under the generator room, is the working end of the great tube*





*Fundamental experimental work in progress on servo-mechanisms for the great differential analyzer now being constructed in the Department of Electrical Engineering*



*Biophysicists at work in the laboratory of the Department of Biology and Public Health where the techniques of the various sciences are concentrated on biological problems*

#### RESEARCHERS AT WORK

discoveries occurred recently when two Institute biologists, seeking a diet of uniform effectiveness for producing rickets in rats, found an unsuspected antirachitic property in milk after all traces of the antirachitic vitamin D had been removed.

Three years ago Professor John W. M. Bunker (see page 346) and Dr. Robert S. Harris, '28, of the Institute's Department of Biology and Public Health began looking for a protein substitute for ground whole corn, the recognized protein constituent of diets for producing rickets in rats. Their search was prompted by the fact that for some unexplained reason not all corn will produce the disease. The need for a protein which could be relied upon to produce rickets led to experiments with casein, the principal protein of milk. The first step was to prepare the protein free of all known forms of the antirachitic vitamin D. Rats fed on this diet, however, not only did not develop rickets, but thrived. Attempts to make casein rickets-producing by predigesting it with enzymes and alkalis were unsuccessful.

The next step was to change the ratio of calcium to phosphorus in the diet, for it is known that a rickets-producing diet for rats should contain four times as much calcium as phosphorus. Diets eight times as rich in calcium, a ratio calculated to produce rickets in its severest form, failed to produce the disease. The conclusion reached in this research is that milk has a hitherto unsuspected antirachitic property, and attempts are now being made to determine what part of the casein molecule is responsible.

What application this discovery may have has not yet been decided. Biologists have suggested that the vast quantities of casein, a waste product of milk processing which represents one of the great losses of agriculture, may prove valuable as a food for poultry and animals.

#### Cellulose

**A**LTHOUGH cellulose is the most abundant organic substance in the world and is used for products ranging from paper, explosives, and cotton textiles, to

artificial silk, cellophane, plastics, and paints, much remains to be learned about the physical and chemical properties of cellulosic materials. In recognition of the need for comprehensive fundamental research and training in this important field, the Institute, cooperating with the Chemical Foundation of New York, will increase the facilities already available at Technology for study and research in cellulose technology. Beginning next autumn the Institute will establish a course of lectures on the chemistry of cellulose and related substances which will be given by Professor Clifford B. Purves of the Department of Chemistry. The subject, which will be a graduate one in the Department of Chemistry, will be a sequel to the subject in carbohydrates given by Professor Robert C. Hockett and will consider the basic chemistry of the subject rather than industrial practice.

Professor Frederick G. Keyes, Head of the Department of Chemistry, and Professor James F. Norris, Director of the Research Laboratory of Organic Chemistry, will supervise the new development. Professor Purves has been entrusted with technical direction of the cellulose laboratory. Associated with him in the laboratory will be Dr. F. B. Cramer of Princeton University and Dr. D. H. Grangaard of Ohio State University, who have been appointed research associates on the staff of the laboratory.

Although topics of research may deal with any carbohydrate or allied substance, special attention will be given to the fundamental chemistry of cellulose and other polysaccharides, and to that of the simpler carbohydrates rather closely related to them. Adequate laboratory accommodation has been set aside, and a substantial fund has been made available for the purchase of special facilities and equipment that may be necessary for teaching and research.

It was also announced that the Institute has established a limited number of cellulose chemistry fellowships, and will assign a limited number of teaching fellowships to the cellulose laboratory. These fellowships may be allotted to suitable candidates who wish to undertake research in the field.



# Abrasives are Vital to Industry

## Grinding Wheels

ONE of industry's valuable production tools is the grinding wheel. It is furnished as small as  $3/32''$  for delicate die finishing. A 42" diameter wheel grinds crankshafts in the automotive industry. A ten-ton pulpstone converts wood into pulp in the paper industry. There is a grinding wheel for each of industry's grinding jobs — made of Norton Abrasives.

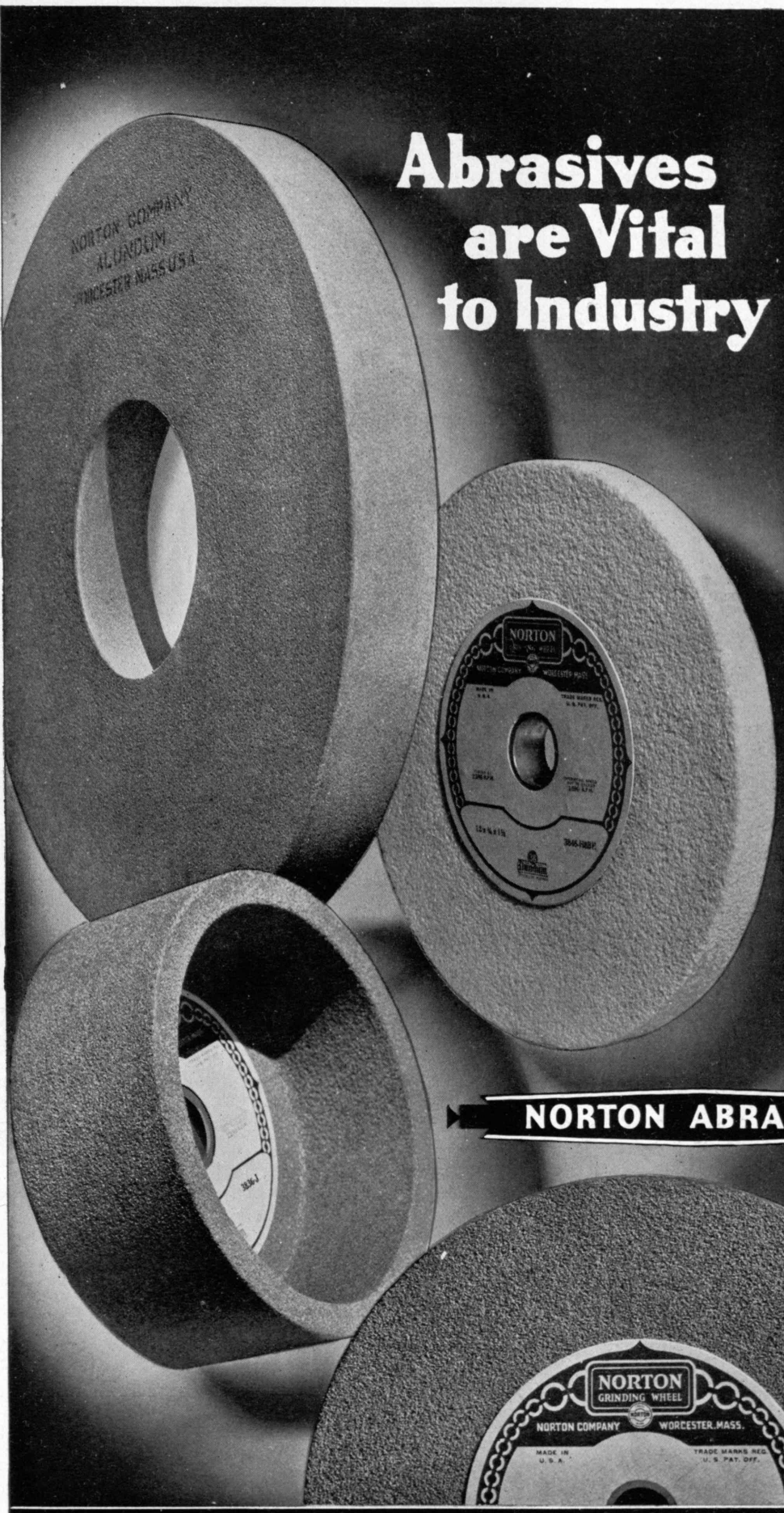
It should be of public interest that Norton Abrasives have such a vital part in the production of the things that make our daily lives pleasanter and more comfortable.

With the grinding wheel are associated other abrasive products — oilstones that keep our tools and cutlery in condition, abrasive paper (sandpaper) rubbing bricks and stones of every description. Norton Abrasives go into refractories for handling heat and into floor surfaces to make them non-slip.

**NORTON ABRASIVES**

**NORTON COMPANY**  
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# ALUMNI

## DAY<sup>1 9 3 7</sup> PROGRAM

### JUNE 7<sup>TH</sup>

FOR TECHNOLOGY ALUMNI AND THEIR GUESTS

Including the  
National Housing Conference:  
**TOMORROW'S HOMES**

#### HAVE YOU ONE OF THESE?

*A folder, of which the above design appeared on the cover, has been sent, together with application blanks, to all Alumni who requested further information on reunion events. If you have not received and wish a copy of this complete program, call or write the Alumni Office at M.I.T. Applications already received indicate a record attendance for all reunion events on or adjacent to Alumni Day*

#### Stratton Prizes

SIX years ago the late Dr. Samuel W. Stratton, then President of the Institute, established a series of prizes to encourage students in the art of writing and public speaking. It was Dr. Stratton's conviction that the engineer or scientist most useful in his profession and to the public is one who gives convincing evidence of his professional responsibility in the ability to write lucidly and speak in public with confidence.

The prizes he founded, and which later were named for him, encourage the writing and presentation of technical papers by undergraduates. It has been the custom to hold the final competition on Class Day, but rapidly increasing interest in the event indicated the desirability of holding it earlier so that all students might have an opportunity to attend. This year President Compton called a general convocation for the finals of the Stratton Prize Competition on May 14, and the six finalists appeared before a larger audience than ever before.

Duane O. Wood, of Denver, Col., a senior in the Electrical Engineering Course in Communications, won first prize for an excellent paper on "Television." Second prize was awarded to Miss Anne A. Person, a sophomore in the School of Architecture, who comes from El Paso,

Texas. Miss Person, the first woman to compete in the Stratton Prize contest, presented a paper on "Glass in Architecture." James D. McLean of Framingham, Mass., a senior in the Coöperative Course in Electrical Engineering, won third prize for a paper on "Circuits in Politics," a discussion of the use of radio- and public-address systems in political campaigns.

President Compton presided, and the judges for the contest were William S. Forbes, '93, of the Forbes Lithograph Manufacturing Company; the Rev. Henry M. B. Ogilby, Rector of the Church of Our Saviour, Brookline, Mass., and Professor Philip Cabot of the Harvard Graduate School of Business Administration.

#### Yearlings in Design

WITH their first house nearing completion in Wellesley, Mass., first-year students of the School of Architecture have finished a contest for the design of the second of the laboratory houses to be built under their direction. The second of these interesting houses, which bring students into close contact with the realities of their profession, was designed by Warren G. Sargent, '41, of Newburyport, Mass. In view of the excellence of many other plans submitted, second, third, and fourth places were awarded to David Jacobson, Jr., '41, of White Plains, N. Y.; John K. Ross, '41, of Montreal, Canada; and John Victor Manget, '41, of Atlanta, Ga.

The winning design is an attractive Colonial house with gambrel roof and an outside chimney. It was designed specifically to conform to a plot of land in Wakefield, Mass. Its arrangement downstairs will include living room, dining room, kitchen, lavatory, one-car garage, and an attractive screened porch. Upstairs, there will be a master's room and two other bedrooms, as well as a recreation room. The design provides for forced-circulation hot-water heating, which permits small pipes and inconspicuous radiators.

Warren Sargent, assisted by a squad of students, will make working drawings for construction of the building, and these will be submitted to contractors for bids. Actual construction of the house will begin next autumn. Construction, from excavation for the foundation to the placing of the last electric light fixture, will be done under the supervision of the students, assisted by members of the Faculty. The house will then be sold, and students will participate in the various steps of the transaction to gain experience in the legal and financial aspects of property transfer. The proceeds of the sale of the house will be used to design and build another house.

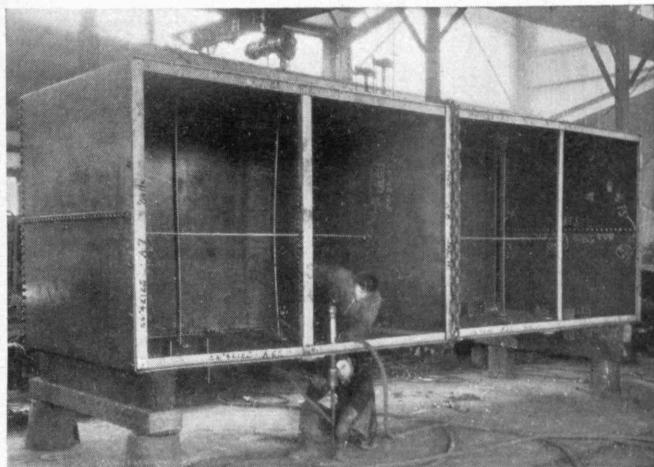
The School of Architecture is developing its Course in such a way that the imagination of students is stimulated and they early begin to grasp many of the varied problems they will encounter when they begin practicing their profession.

#### Sail Ho!

YACHTSMEN are not given to boasting. Therefore it is recorded here simply as a matter of cold but significant fact that Technology's Nautical Association is sailing its way into intercollegiate racing history. Technology crews won the first Intercollegiate Yacht

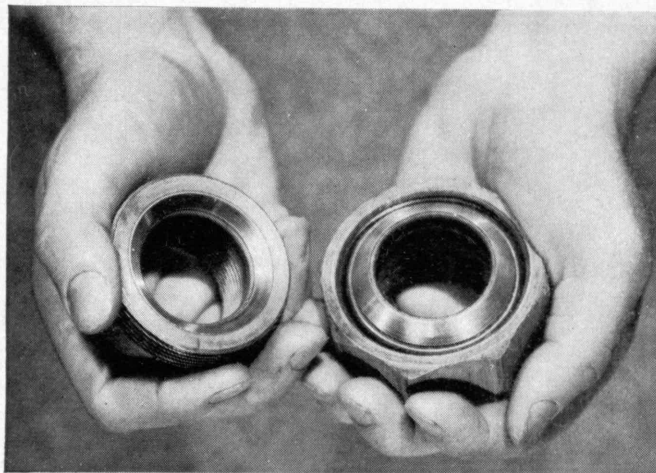
## FOR A 7000-GALLON TANK —OR A 1-INCH PIPE UNION SEAT

• The 6' 9" x 20' x 7' tank shown is an excellent example of a popular application of Revere sheet Herculoy.\* The tank, constructed by the Dover Boiler Works, Dover, N. J., is designed to hold 7,000 gallons of water and is installed on the roof of the Bronx County Jail, New York City. Herculoy is especially recommended for tanks and pressure vessels because of its high strength, ready weldability and resistance to corrosion.



• The Rockwood Sprinkler Company, Worcester, Mass., required a metal for its pipe union seats that would resist corrosion, contain no zinc, be ductile enough for cold working and forming without springing out of shape or causing excessive strain and wear on dies, and at the same time be able to withstand wrench abuse with minimum liability to scoring. Herculoy proved to be ideal for this service.

The Rockwood Union is used largely on process pipe lines where a heavy duty union is required to withstand high pressures and temperatures as well as severe corrosive and erosive action. The seat joint of this union is the vital part, and is double-locked into position. The manufacturer says: "We picked Herculoy principally because of its ability to stand up under these severe service requirements."



# Revere *HERCULOY*\*

## MEETS ALL REQUIREMENTS PERFECTLY

• Revere Herculoy is the ideal material to specify for any purpose where a metal is wanted that has the corrosion-resisting qualities of copper, plus the strength and toughness of steel. Yet it can be readily stamped, drawn, hot and cold forged, welded and worked by other standard methods, on a profitable commercial basis.

Revere Technical Advisory Service will cooperate with manufacturers, fabricators and others who are in a position to benefit by using a metal having this unusual combination of characteristics. For information regarding this service, or further data about Herculoy, write our Executive Offices: 230 Park Avenue, New York City.

\*U. S. Patent Nos. 1,868,679; 1,924,581; 2,002,460; 2,009,977

# Revere Copper *and* Brass

INCORPORATED



EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY • MILLS: BALTIMORE, MD. • TAUNTON, MASS.  
NEW BEDFORD, MASS. • ROME, N. Y. • DETROIT, MICH. • CHICAGO, ILL. • SALES OFFICES IN PRINCIPAL CITIES



### *On the Air*

THOSE who by unfortunate circumstance may not share in person the rich program of Alumni Day events can at least get a taste of what they are missing in an international shortwave radio broadcast of the national housing conference on the morning of June 7. The address of Gano Dunn, who will make the commencement address at the Institute's graduation exercises, will be broadcast from Symphony Hall, Boston, on the following day, June 8.

These broadcasts will go on the air from Station WIXAL of the World Wide Broadcasting Foundation of Boston, a nonprofit organization which devotes itself entirely to educational programs of great variety and absorbing interest. The broadcasts will go out on 11.79 megacycles (25.45 meters). The program of the national housing conference will be on the air from 10 A.M. until its close about 1 o'clock. The commencement broadcast will begin promptly at 11 A.M. on June 8, and will cover the opening exercises and Mr. Dunn's address. Station WHDH in Boston will broadcast the program locally on a wavelength of 830 kilocycles.

These programs should be heard clearly in most of New England, but may be affected by the skip distance phenomena peculiar to shortwave transmission in New York, New Jersey, and Pennsylvania. The Middle Western States and the Pacific Coast region should receive them clearly, as will Western Europe.

Racing Association dinghy championship, which was held on the Charles River on April 25 and 26, defeating skippers from Harvard, Princeton, Dartmouth, Cornell, Brown, Williams, and Yale in that order.

A well-known yachtsman, who was an observer at this regatta, spontaneously wrote President Compton this comment: "I was a close attendant at all of the races and was also privileged to be among those present at their dinner held on Saturday evening at the Hasty Pudding Club of Harvard. I speak with a background of long personal experience when I state that I have never seen bettered, I might almost say equalled, the sustained skill in race after race of the skippers and crews of these dinghies. Like all thoroughbreds, they played the racing rules to the limit without going over the edge. The sportsmanship and good-fellowship throughout were of the very highest order, and you would have been pleased to have observed the friendly way in which intensive competitors were calling each other by their first names and nicknames. Between races they rotated boats and at such times the landing platform was a beehive of activity, when there was quite a bit of fraternizing. The quality of the men seemed to be of the highest type and almost as if they had been picked by the heads of their respective colleges. Again, I speak with the authority of one of many years' observation in such matters when I state that the friendly rivalry was beautifully in contrast to the feeling between competitors in the major athletic sports when the handshake there quite resembles that in the prize ring. I cannot imagine any better, any more sincere, or any more active ambassadors of true good will between

colleges than this collection of dinghy sailors. I cannot place too high praise upon the work of Jack Wood ['17] and his assistants. The tactful and efficient manner in which Jack so generously looked after every little detail was, I know, an important factor in the success of this regatta."

A week earlier the Nautical Association sent crews to Annapolis where they defeated the best the United States Naval Academy could muster in Navy knockabouts. Technology crews won second place in the Boston Dinghy Club Challenge Cup Regatta on May 9, Brown University winning the cup over a fleet of 14 other college crews. The Institute's outstanding racing skipper is Runyon Colie, Jr., of Gloucester, Va., a freshman, who is now recognized as the leading college skipper of Eastern waters.

Aside from the intercollege races, there are daily intramural contests on the river in which faculty as well as students participate. Interest in sailing has grown steadily and nearly 400 students are now members of the Nautical Association. The success of the venture as a student activity has so stimulated public interest that plans to introduce small-boat sailing on the Charles River Basin as a public recreation are now being discussed by state and municipal authorities.

Establishment of the Henry A. Morss Nautical Fund, given to the Institute by Mrs. Morss in memory of her husband who was a graduate in the Class of 1893, has enabled the Nautical Association to purchase a new power tender which is proving useful for placing flags on the racing courses and giving assistance on the rare occasions when squalls prove too much for the dinghy crews. The new boat, an 18-foot craft, is fast and easily maneuvered.

In addition to his many other activities as sailing master at the Institute, Walter C. Wood, '17, has been giving a series of excellent radio talks on "Sails and Sailors" from the shortwave station of the World Wide Broadcasting Foundation in Boston. These international broadcasts have been heard in Europe, Australia, South Africa, and the Far East.

### *Control by Statistics*

THE course in statistical methods of control established this year in the Department of Economics and Social Science indicates the significance of a relatively new field of applied statistics that has been quietly progressing during the past few years. Although the laws of chance have been successfully applied in many fields, including, for example, astronomy, physics, gambling, and agricultural experimentation, it was not until the Twenties that they were effectively used to control the quality of manufactured products.

Dr. Walter A. Shewhart and his associates in the Bell Telephone Laboratories pioneered in this applied research and until 1931 the fruits of their labor remained with their company. However, publication of a treatise by Dr. Shewhart aroused immediate interest, and the possibilities of the technique were more generally appreciated. Its application in various fields followed recognition by highly competent English statisticians and ready industrial coöperation (*Continued on page 358*)

MEMO TO: Mr. Alumnus M. I. T., 1937.

TECH has trained you to analyze problems - to "Get The Facts". Business needs YOU and your Tech training. Selling needs such ability more than does manufacturing, or research, or finance.

Modern selling demands the light of facts on its problems - and some Tech-help to correct them:

- 1 - Selling a product usually costs twice the total amount to produce the raw material and manufacture the finished product. Why?
- 2 - Reducing "cost of sales" by even 3% will frequently increase "net profits" almost 30%. Why?
- 3 - Engineers test the profitability of every item used in manufacturing - from pins to power houses - but sales and advertising dollars too frequently are glibly scattered about, with no adequate tests to pre-determine their profitability. Why?
- 4 - Many "production-minded" managements still emphasize "tonnage" or "gallage", and neglect to emphasize "profits". Why?
- 5 - Companies frequently "sweat and strain" to save a few cents per unit by coordinating their production processes, then loosely waste several dollars per unit, by failing to coordinate their selling processes. Why?

We urge you, Mr. Tech Alumnus, 1937, to devote your Tech-trained mind to the profitable solution of sales problems. Learn manufacturing processes to make yourself a better salesman - so you can "find out what people like and do more of it, and what people don't like, and do less of it".

You can prove valuable to yourself and to your company by learning to "make sales solely to increase net profits".

Our solution of such problems  
has helped progressive com-  
panies to increase profits.  
We can help your company, too.

**RYAN,\* LEACH & GOODE**  
*Sales Engineers*

**NEW YORK**

**CHICAGO**

\*PAUL RYAN-XV-1922  
3

## THE INSTITUTE GAZETTE

(Continued from page 356)

through the American Society for Testing Materials, the American Standards Association, the American Society of Mechanical Engineers, and the British Standards Association.

Although actual installations of quality-control programs still remain few, the future of the field is sufficiently certain to warrant its inclusion in the Technology curricula. This expectation of permanency is well supported by isolated, but highly successful applications to such variable-quality products as coal, coke, cotton yarns, cotton textiles, woolen textiles, manufactured gas, lamps, spectacle glass, building materials, and manufactured chemicals. Quality control follows from the fact that in ordinary manufacture, the units of a product are far from identical, since the cost of making all units approximately identical would be unwarranted in terms of the uses and value of the product. Some variation in quality is thus conceived as economically justifiable, and it is the purpose of a quality-control program to develop statistical methods of measuring and describing the actual quality distribution. The method also makes it possible to ascertain the proper economic limits to such variations and to suggest ways and means of facilitating allocation and correction of production troubles when these limits are exceeded.

The subject thus naturally embraces an analysis of economic value and business costs, a presentation of the basic theory of probability, sampling, and ordinary statistical methods. It includes, finally, a consideration of plant production processes, testing, setting of specifications and standards, and determination of indexes of quality. Economic, mathematical, and engineering abilities are, accordingly, all needed by those who expect to handle industrial problems dealing with quality statistics. These methods have been used in obtaining more representative samples of coal or coke from the thousands of tons piled at a wharf. A quality-rating scheme has been developed at the Western Electric Company through which the multiple-factor quality of switchboard selectors can be expressed by a single index. Correlation tests have been devised to replace highly expensive destructive testing (life tests on lamps, tensile strength tests on steel beams) by equally effective and much cheaper tests (filament wire tests, hardness tests). Finished cotton textile quality is being successfully ascertained by study of small, statistically-sized samples of the raw ingredients. How many units to test for any specified risk, how to set specifications to minimize expected losses or costs, what risks are run by the consumer and producer in given situations, how bad the production process may go before the sample sizes and other factors need adjustment are among the industrially important questions which have been successfully attacked by this young, but growing field of applied statistics. (Continued on page 360)

## A STATEMENT IN UNIQUE FORM



The statement below, made up in an original way, is presented with the object of calling particularly to your attention the care with which the policyholders' interests are protected by the Boston Insurance Company.

## Boston Insurance Company

AS FILED WITH MASSACHUSETTS INSURANCE DEPARTMENT, DECEMBER 31st, 1936

### LIABILITIES

Losses in Process of Adjustment.....	\$1,030,473
Reserve for Losses Unreported.....	199,375
Reserve for Federal Taxes.....	98,000
Reserve for Dividends.....	270,000
Unearned Premium Reserve.....	4,547,850
All Other Reserves and Liabilities.....	1,052,309
Policyholders' Surplus.....	18,134,403

Based on Dec. 31, 1936 market quotations the policyholders' surplus is \$19,253,741.

\$25,332,410

### ASSETS

Cash .....	\$1,008,639
U. S. Government Bonds (short term).....	21,834
U. S. Government Bonds (short term).....	199,375
Cash.....	98,000
Cash.....	270,000
U. S. Government Bonds.....	2,869,463
State, County and Municipal Bonds.....	1,678,387
State, County and Municipal Bonds, Railroad and Public Utility Bonds.....	1,052,309
Public Utility and Corporation Bonds.....	828,933
Stocks.....	7,028,743
Old Colony Insurance Company.....	8,022,780
Real Estate (Home Office Building).....	1,293,549
Premiums and Accounts in Course of Collection.....	960,398
	\$25,332,410

Home Office: 87 KILBY STREET, BOSTON, MASSACHUSETTS  
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HENRY R. HEDGE, '96, Vice-President



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79,250 lbs.	33,850 lbs.
Brinell Hardness	
124	59

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### APPEARANCE:

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## THE INSTITUTE GAZETTE

(Continued from page 358)

### Report on Mining and Metallurgy

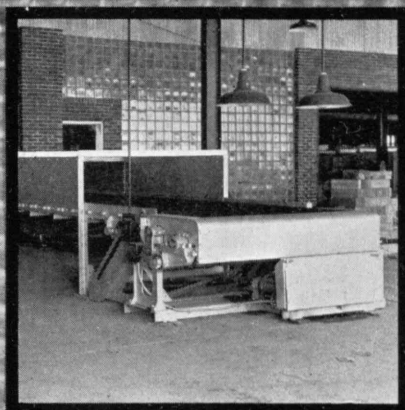
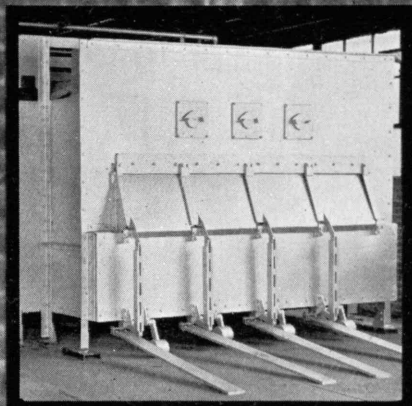
**F**ORTUNATE is the Institute in having a group of Departmental Visiting Committees that do more than dine together and make cursory inspections. These members, many of whom are not Technology graduates, are all keenly interested in the Institute's education program and are professionally competent, some pre-eminently, in the fields covered by the departments they visit. They bring to the staff of each department the perspective of practical experience and frequently contribute suggestions that result in new educational techniques and improved academic organization.

A convincing example of such contributions is afforded by the recent Report of the Visiting Committee\* on the Department of Mining and Metallurgy which resulted in the division of this Department, as reported in *The Review* last month, into the Department of Metallurgy and the Department of Mining. In summarizing this notable report for *The Review*, President Compton writes: "The distinguished Visiting Committee on the Department of Mining and Metallurgy emphasized the opportunities at the Institute for maintaining this Department's front rank in the professional fields which it covers. Technology established the first American laboratories in mining and metallurgy and it has been markedly successful in graduating mining engineers and metallurgists who have won for themselves major places in industry and research.

"After extensive study of our curriculum, the Committee made recommendations to the Corporation toward the end of assuring our continued leadership in these fields. One of these recommendations, which was acted upon immediately by the Corporation and the Faculty as reported in *The Review* last month, was as follows: 'Historically, it was but natural for mining and metallurgy to be taught within a single department. This was the case in most educational institutions. But conditions have changed and the fundamental knowledge upon which each rests has greatly expanded. Consequently, it is felt that the combined load incident to the guiding of the future of the work in process and physical metallurgy and ceramics is sufficient to warrant all of the time of an executive head for a department of metallurgy and ceramics.'

"Beginning next autumn, the Department of Mining Engineering will be administered as a separate professional department under the direction of Professor W. Spencer Hutchinson, '92, who for many years has been head of the Courses in Mining and Metallurgy. His Department will also include the Course in Petroleum Production. The new Department of Metallurgy will be directed by Dr. Robert S. Williams, '02, Professor of Physical Metallurgy, and will include the Course in Ceramics. The creation of this (Continued on page 362)

\* Members of this Committee for 1936-1937 are: Bradley Dewey, '09, Chairman, Louis S. Cates, '02, B. Edwin Hutchinson, '09, Rufus E. Zimmerman, '11, Edwin D. Martin, '22, George A. Packard, '90, Howard A. Poillon, and John Johnston.



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## THE INSTITUTE GAZETTE

*(Continued from page 360)*

new Department will not only enlarge and intensify our work in metallurgy; it will enable us to do a still better job in teaching mining and in promoting research in mining engineering.

"In line with the Institute's educational policy, the Committee recommended increased emphasis on fundamental scientific subjects in both the fields of mining and metallurgy. 'The mining curriculum,' reiterated the Committee in its report, 'should emphasize fundamental sciences, and engineering and economic principles, rather than descriptive and explanatory matters. If in the teaching of these principles, examples can be given of their practical operation, it will help. The more actual experience at the mines that a student can have in his summer vacations, the better. But above all, because much mining is located in faraway places, a student must start with a knowledge of the fundamentals of mathematics, physics, chemistry, geology, mechanical and electrical engineering, and enough sociology and economics to start him on the right path.'

"The Committee was impressed by our graduate courses in mine evaluation, and in its discussion of the undergraduate mining curriculum suggested that the work in fire assaying be turned over to those responsible for the teaching of process metallurgy and that increased emphasis be given to the application of the principles of colloid chemistry and further use of the microscope in flotation in studies in the courses on ore dressing.

"In the teaching of metallurgy, the Committee recommended that courses on both process and physical metallurgy should be approached from the side of physical chemistry, and that studies of unit metallurgical operations should constantly develop and emphasize their relationships to the basic laws of physical chemistry. . . . 'The unit operations of process metallurgy are akin to those of chemical engineering and are more intimately tied to those of physical metallurgy and ceramics than to those of mining.'

"The Committee was favorably impressed by the growth, character, and spirit of the staff of the Division of Physical Metallurgy. It anticipates additional growth in this field with the result that more space will be needed. Already space needs are acute in connection with instruction in metallography and x-ray interference phenomena.

"It is our recommendation,' reported the Committee finally, 'that the undergraduate instruction in physical metallurgy include a full year's course in physical chemistry, comparable to that given to students in chemistry and chemical engineering. The work in ceramics, affiliated as it is with the work in physical metallurgy, is well founded and in good hands. The only suggestion is that it might be well to place more emphasis upon the study and development of high-temperature ceramics, with special reference to the refractories used in metallurgical processes.' *(Concluded on page 364)*



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The Institute publishes a variety of bulletins, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

*Ask for the following pamphlets by their descriptive numbers*

1: For general information, admission requirements, subjects of instruction, ask for Bulletin 1.

2: For announcement of courses offered in Summer Session, ask for Bulletin 2.

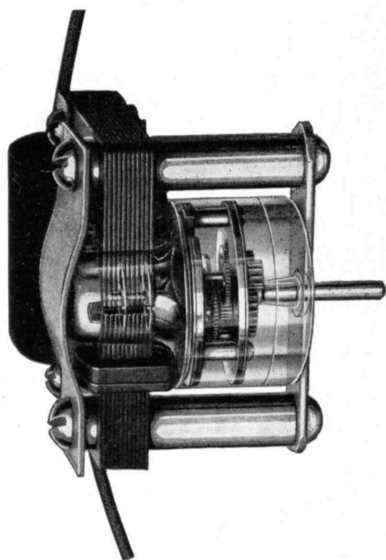
3: For information on courses in Architecture, both Undergraduate and Graduate, ask for Bulletin 3.

4: For a popular presentation of Educational Opportunities offered at M.I.T., ask for Bulletin 4.

*All inquiries sent to the address below will receive prompt attention*

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ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.



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## THE INSTITUTE GAZETTE

(Concluded from page 362)

"I am happy to report that many of these recommendations will be taken care of in the revised curricula which have been prepared to go into effect next fall when the present Department is divided, as recorded above, into the Department of Mining and the Department of Metallurgy. It is a pleasure to bear witness to the intensive and intelligent study made by this Visiting Committee and to the contributions it has made toward maintaining the Institute's leadership in teaching and research in mining, metallurgy, and ceramics."

### Alumni Elections

ALUMNI have, by mail ballot, overwhelmingly ratified the National Nominating Committee's selection of Marshall B. Dalton, '15, as president of the Alumni Association for 1937-1938; of Charles R. Boggs, '05, as vice-president for two years; of George A. Packard, '90, and Joseph P. Draper, '00, as members of the Association's Executive Committee for the next two years; and of Arthur L. Hamilton, '99, Edward H. Davis, '01, Herbert D. Swift, '15, Anthony Anable, '20, and Edwin D. Martin, '22, as representatives-at-large on the Council of the Alumni Association. Also elected at the April 10 balloting were the Committee's nominees for term members of the M.I.T. Corporation: Albert F. Sulzer, '01, George E. Whitwell, '15, and William E. R. Covell, '23.

Four of the Alumni Association's electoral districts chose new representatives on the National Nominating Committee: Edward L. Moreland, '07, of Wellesley Farms, Mass., was elected from District 1; Redfield Proctor, '02, of Proctor, Vt., from District 2; Frederick W. Barker, '12, of Syracuse, N. Y., from District 4; Alfred T. Glassett, '20, of New York City, from District 5.

### Alumni Council

AT the meeting in April at which the above elections were announced, the Alumni Council unanimously approved a report of its Committee on Student Welfare, recommending that a gymnasium be the first large project undertaken by the Institute for supplying much needed facilities for enriching student life.

The Committee was greatly assisted in its study by an able group of students who made a comprehensive investigation of student needs. In accepting the report, the Council voted to profer to President Compton the assistance of the Alumni Association in any program for student welfare that the Institute's Corporation decides to undertake.

The Committee, which was appointed at the request of President Compton, was composed of Raymond Stevens, '17, Chairman, Samuel C. Prescott, '94, Henry E. Worcester, '97, Lawrence Allen, '07, A. Warren Norton, '21, Edmund G. Blake, '31, and Gilbert M. Roddy, '31.

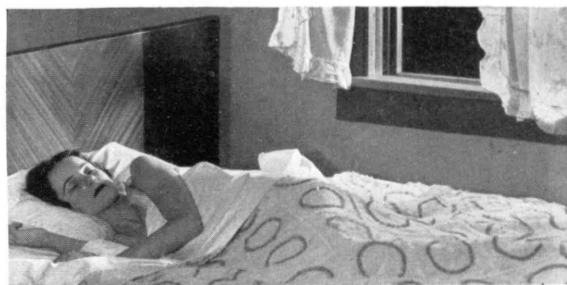
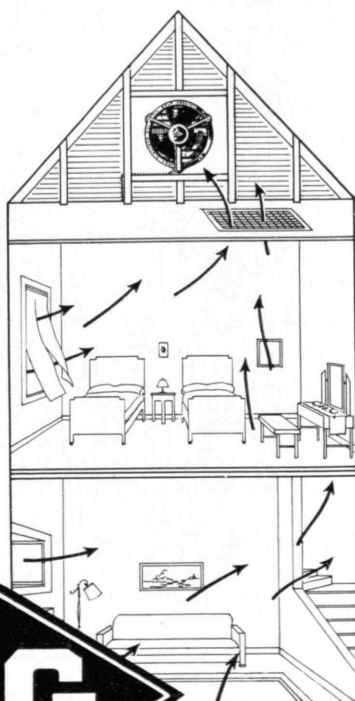


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## SIGNALS FROM THE GREAT OUTSIDE

*(Continued from page 335)*

of determining the magnetic field on the sun. We have mentioned that beyond 50 degrees away from the equator the cosmic-ray intensity is practically constant. This indicates that no particles of less than a certain energy (about two thousand million electron volts) even get close enough to the earth to become affected by its magnetic field, that is, get as close as the moon. This, of course, may mean that there are no cosmic rays having less than this cut-off energy even out in interstellar space. But Professor Vallarta's suggestion is that the magnetic field of the sun is responsible. If the earth were nearly in the plane of the sun's magnetic equator, and if the sun's field were

strong enough, many of the low-energy cosmic rays would be warded off by the sun's field before they could have a chance to get through the weak spot in the earth's own defences near its poles. From a knowledge of the cut-off energy, and using the Lemaitre-Vallarta calculations again, Professor Vallarta finds that the average magnetic field at the surface of the sun should be about 40 gauss. This checks surprisingly well with the estimates astrophysicists have made from spectroscopic data.

Thus we see that after much more careful measurements and further calculations have clarified our knowledge, the cosmic rays will be a most useful means of seeing beyond the earth; they will make possible electric telescopes, so to speak, which will be used to supplement the visual telescopes (*Concluded on page 370*)

VIRGINIA SMELTING COMPANY *West Norfolk, Virginia*A. H. EUSTIS, *Pres.*—M.I.T. '03F. A. EUSTIS, *Sec'y-Treas.*—M.I.T. '03CHARLES W. JOHNSTON, *Gen'l Mgr.*—M.I.T. '05F. W. BINNS, *Sales Eng.*—M.I.T. '21

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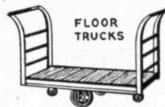
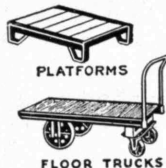
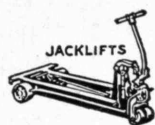
*The research facilities of Commercial Solvents Corporation are indicated by the following major scientific divisions of the Research Department located at Terre Haute, Indiana:*

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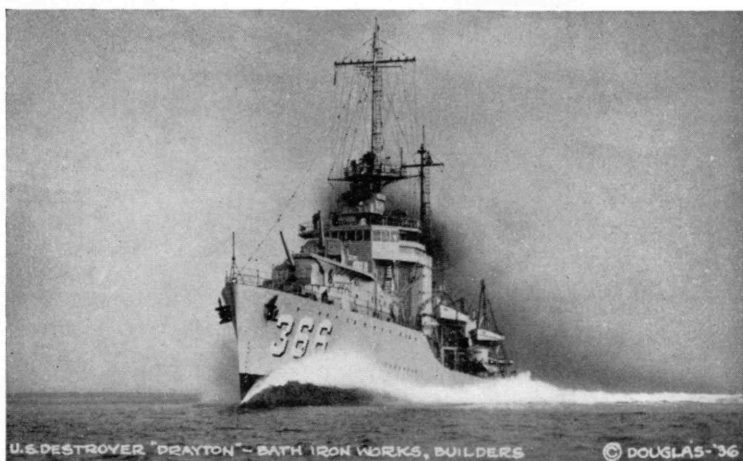
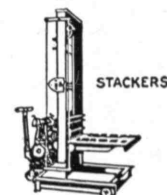
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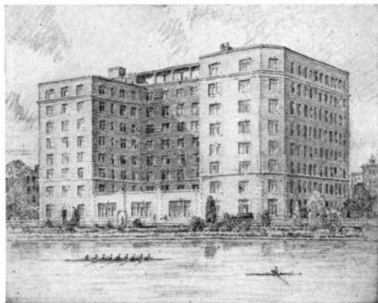
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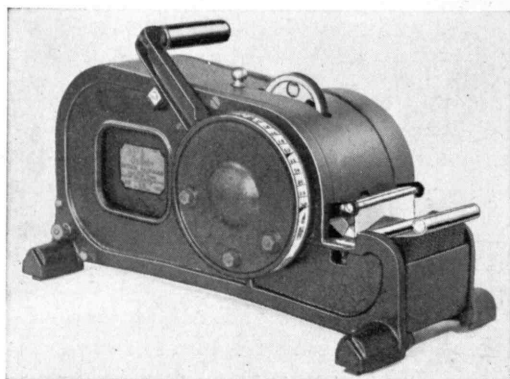
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## SIGNALS FROM THE GREAT OUTSIDE

*(Concluded from page 366)*

to tell us more about the great outside. Coming a little closer home, once we know what cosmic rays are, we can use them as high-speed projectiles to explore the workings of the nucleus. They have already helped in the discovery of the positron and they will undoubtedly help more in the future. Although we cannot control their energies and intensities at will, they have velocities far greater than anything we can hope to produce here on earth for some time to come.

## WALLPAPER AND ATOMS

*(Concluded from page 342)*

magnification is unfixed in patterns based upon square and hexagonal nets); (3) select a motif; (4) fix the position of the motif with respect to the pattern origin.

WE may now pass to a brief consideration of the three-dimensional, or space patterns. By adding a dimension, the number of lattices increases from five specialized types to 14 specialized types, and the number of pattern types leaps from 17 to the staggering total of 230. No attempt will be made to give any systematic illustrations of these. A perspective view of the symmetry operations alone of one of the 230 possibilities is shown in Fig. 26. The relatively simple pattern resulting by appropriately inserting the motif of atoms represented by the chemical formula,  $\text{FeS}_2$ , into this pattern type is shown beside the drawing.

The crystallographer deals with these space patterns of real atoms. One field of endeavor in the science of crystallography is the determination of these patterns for crystals of various chemical compositions. A problem of this kind is solved in several stages:

- (1) Crystal-pattern analysis
  - (a) determination of the space-pattern type
  - (b) determination of the space-lattice dimensions
- (2) Motif analysis, i.e., determination of the positions of the parts of the motif referred to the pattern origin.

*Crystal-pattern analysis*, as the term is used here, has been a much neglected science, but it has recently received intensive attention in the mineralogical laboratory of the Institute. As a result of this, a highly developed "Technology technique" in crystal-pattern analysis has sprung up. Two special instruments have been developed to facilitate this technique. The first of these is a crystal-pattern analyzer (page 342, lower right), which resolves space patterns into stacks of plane patterns. The second is a precision dimension analyzer with the aid of which the lattice constants of a crystal pattern may be fixed with a precision of five or six significant figures.

### THE HANDBOOK OF COLORIMETRY

*Prepared by the STAFF OF THE COLOR MEASUREMENT LABORATORY, Massachusetts Institute of Technology, Under the Direction of ARTHUR C. HARDY.*

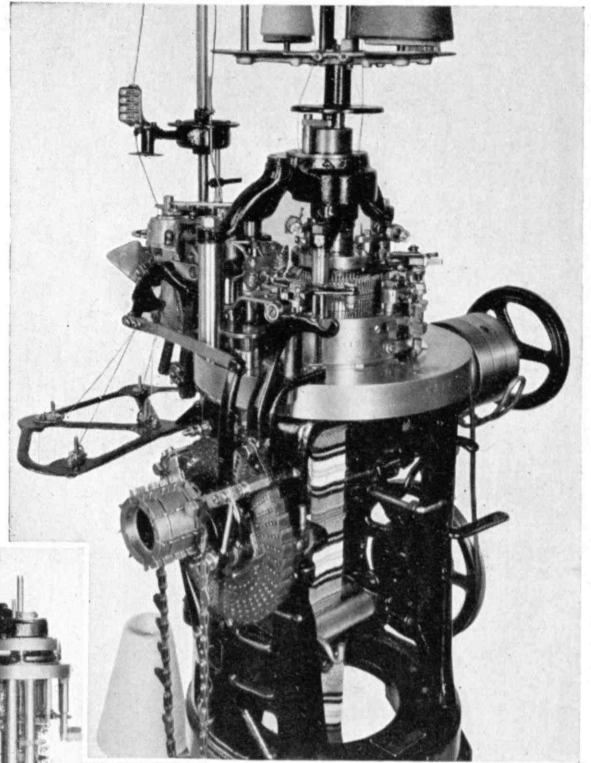
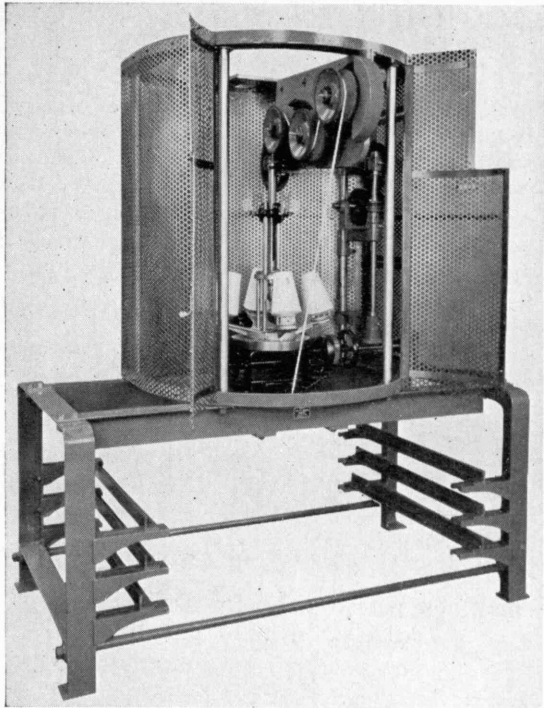
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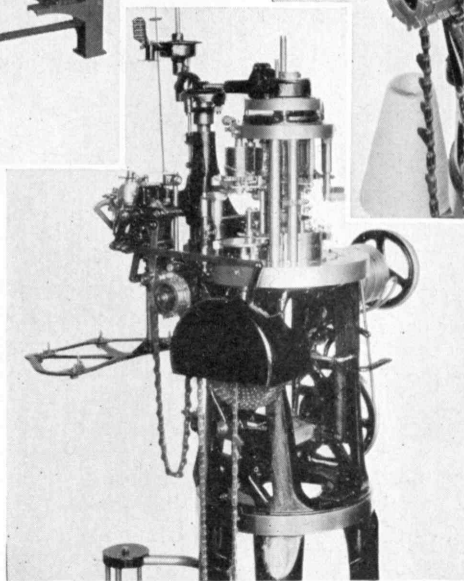
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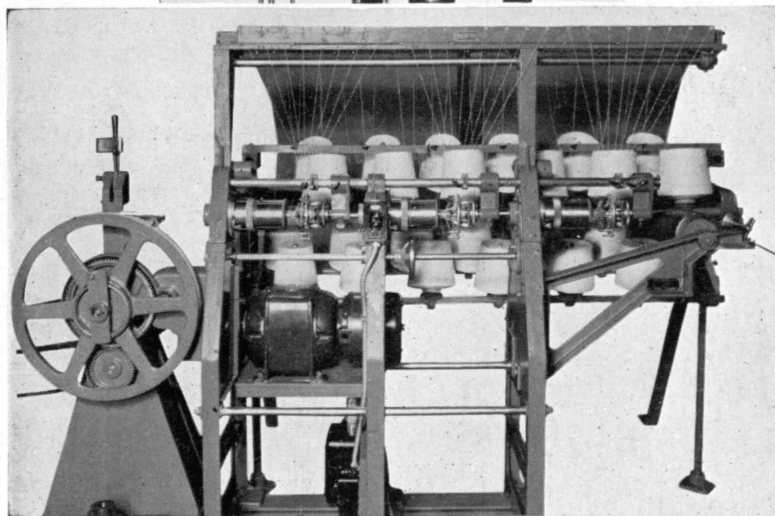




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Sterling Turner....1910	John McNiff.....1931
John R. Fuller.....1918	George Carter, Jr..1931
Roger Johnson.....1922	Howard Richardson1931
Cyrus Haller.....1923	Henry Hartwell....1931
William Lowell, Jr..1926	Robert McCormack.1933
Orrick Biggs.....1926	Ralph Ranger.....1934
Lawrence Burns....1927	Robert Metcalf.....1934
Harold Heins.....1927	Patsy Guarino.....1935
Gustav Stackelhaus..1928	Charles Ellis.....1936
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## COMMUNITY PLANNING

(Continued from page 345)

to central rehousing [in Great Britain], and especially to rehousing in multi-storey tenements, which alone make satisfactory provisions for the dense populations found in nearly all slum and overcrowded areas." — *Foreword*. Good illustrations.

COUNCIL FOR RESEARCH ON HOUSING CONSTRUCTION. *Housing standards and statistics; the second report of the Council*. P. S. King, 1935.

"In [the second volume] a strong plea is made for a thorough-going survey of existing housing conditions as a preliminary to constructive action, and for this survey to be continually kept up to date." — *The Town Planning Review*.

GROPIUS, WALTER. *The new architecture and the Bauhaus*. Faber, 1935.

Dr. Gropius points out the struggle for new forms and their dependence on a perception of space and a knowledge of technological developments.

LONDON CITY COUNCIL. *Housing, 1928 to 1930*. Council, 1931. This volume presents, mainly through plans and photographs, the achievements of the Council under the Housing Acts during the years stated.

MAYER, ALBERT. '19. *A technique for planning complete communities*. *Architectural Forum*, January and February, 1937.

Describes the approach to the Suburban Resettlement Administration in the planning of the Greenbelt towns.

MCGRATH, RAYMOND. *Twentieth Century houses*. Faber, 1934. "The houses pictured in this book are a selection representative of the small number of good new houses in 20 different countries." — *Foreword*.

This book also includes a brief history of the architects and their works.

MUSEUM OF MODERN ART. *Modern architecture: international exhibition*, New York. Museum, 1932.

Contains many photographs, Lewis Mumford's article on housing, and several short bibliographies.

OXHOLM, AXEL H. *The small-housing scheme of the city of Stockholm*. United States Bureau of Foreign and Domestic Commerce. Government Printing Office, 1935.

"Generally recognized as being the most successful of its kind in Europe." — *Foreword*.

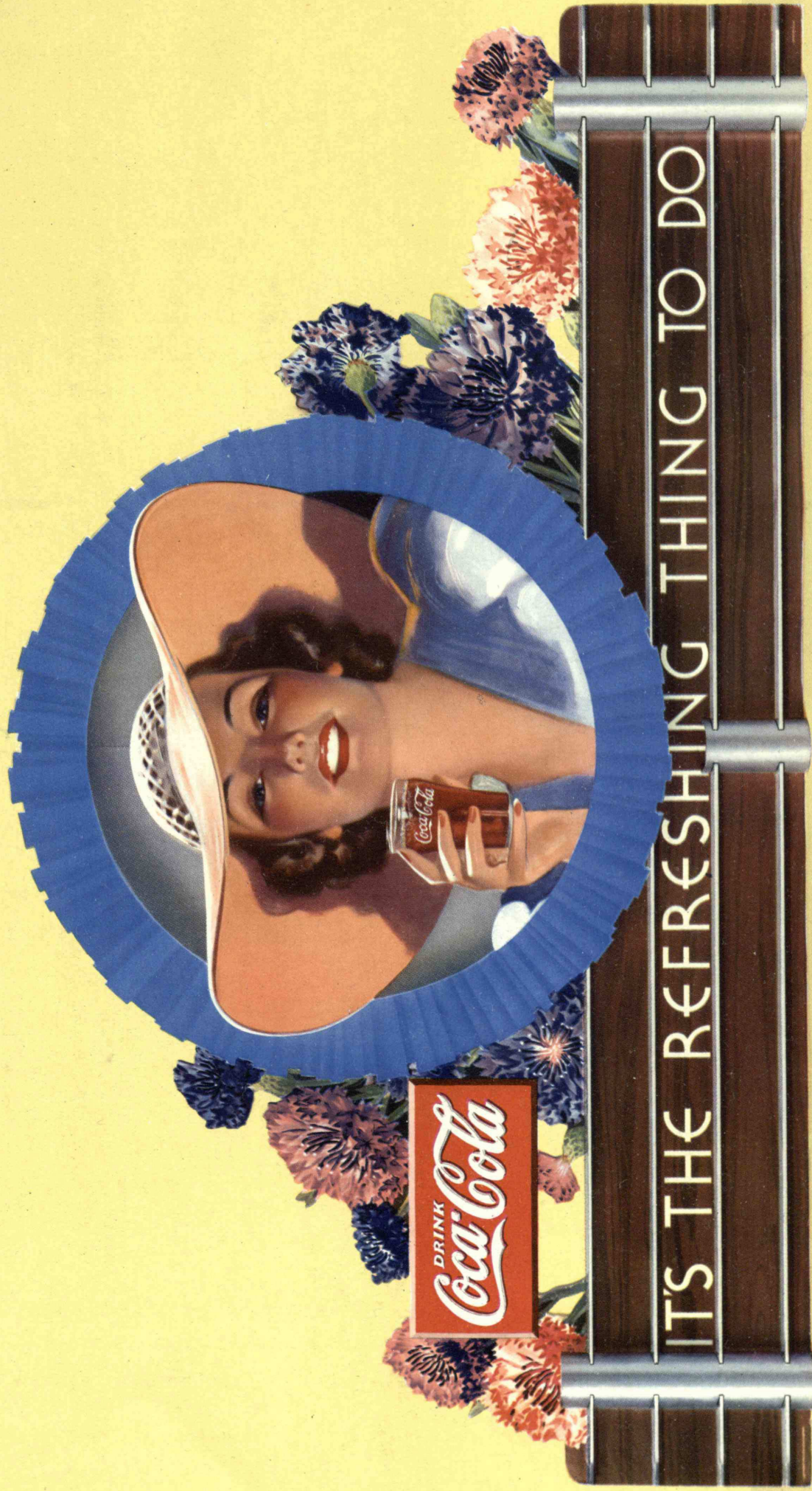
PERRY, CLARENCE A. *Rebuilding blighted areas; a study of the neighborhood unit in a replanning and plot assemblage*. Regional Plan Association, Inc., 1933.

"A description of the present condition of [Winfield, an old Long Island settlement in the Borough of Queens, New York City] is followed by a suggested solution, in the form of detailed plans and perspectives, a statement of the financial factors involved, and an analysis of the problem of assembling the many parcels of land required for the development." — C. S. Ascher in *American Journal of Sociology*.

REGIONAL PLAN OF NEW YORK AND ITS ENVIRONS. *Regional survey of New York and its environs*. Volume VII. *Neighborhood and community planning*. Author, 1929.

"Three monographs bound in one volume: (1) 'The Neighborhood Unit,' by Clarence Arthur Perry, explains the principles of a planned community centering around a school; (2) 'Sunlight and Daylight for Urban Areas,' by Wayne D. Heydecker, discusses the importance of sunlight to human life and methods of planning communities and placing buildings so as to obtain maximum sunlight; (3) 'Problems of Planning Unbuilt Areas,' 'The Planning and Subdivision of Land,' by Thomas Adams; 'Laws of Planning Unbuilt Areas,' by Edward M. Bassett; (Concluded on page 374)





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Boston, Mass.**COMMUNITY PLANNING***(Concluded from page 372)*

'The Economics of Land Subdivision,' by Robert Whitten. This monograph contains valuable information on laying out new towns or subdivisions. The volume is an excellent introduction to the subject of site planning." — *Housing Officials' Yearbook, 1935.*

SCHUSTER, FRANZ. *The building of small dwellings with reasonable rents.* Hoffmann, 1935.

A survey extending over 17 different countries to show what has been done successfully in the way of site planning and standardization of the unit house plan.

UNITED STATES BUREAU OF INDUSTRIAL HOUSING AND TRANSPORTATION. *Report of the United States Housing Corporation. Volume I, Organization, policies, transactions; Volume II, Houses, site-planning, utilities.*

"The second volume . . . contains architectural drawings and descriptions of each of the projects designed by the United States Housing Corporation." — *Editor's note.*

UNITED STATES FEDERAL HOUSING ADMINISTRATION. *Technical Bulletins.* Number 1, *Recent developments in dwelling construction*; Number 2, *Modern design*; Number 3, *Contract documents for small house construction*; Number 4, *Principles of planning small houses*; Number 5, *Planning neighborhoods for small houses.* Government Printing Office, 1936.

UNITED STATES PUBLIC WORKS ADMINISTRATION. Housing Division. *Unit plans.* Government Printing Office, 1935.

"This book contains plans and accompanying data which have been designed and assembled by the Housing Division of the Public Works Administration. Its purpose is to give architects and engineers the benefit of this information in designing low-rent housing units. In the absence of organized data the government has found it necessary to provide this useful material." — *Foreword.*

WRIGHT, HENRY. *Rehousing urban America.* Columbia University Press, 1935.

"Mr. Wright's remarkable gifts in planning and his wide experience in housing make this book an invaluable education for the architect and the community planner, who are equipping themselves for prospective service to the community. And in addition, the data are indispensable for those whose technical understanding in housing lags behind their social vision." — Lewis Mumford in the *Foreword.*

YORKE, F. R. S. *The modern house.* [Second Edition.] Architectural Press, 1935.

A presentation of the modern house, including the pre-fabricated, with special attention given to materials and methods of construction. Well illustrated with plans and views, interior and exterior, of houses abroad and in the United States.

NOTE: The above material will be set aside for inspection in the M.I.T. Architectural Library in Rogers Building, 491 Boylston Street, Boston, during the month of June.

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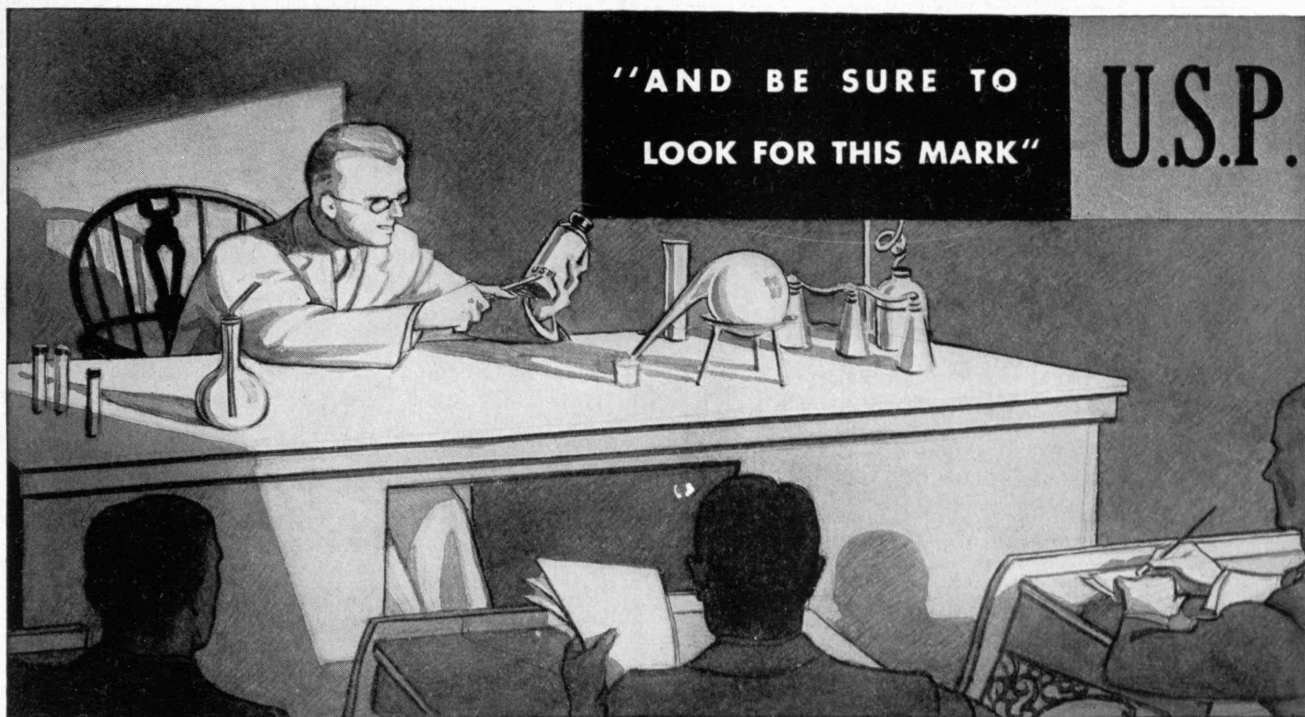
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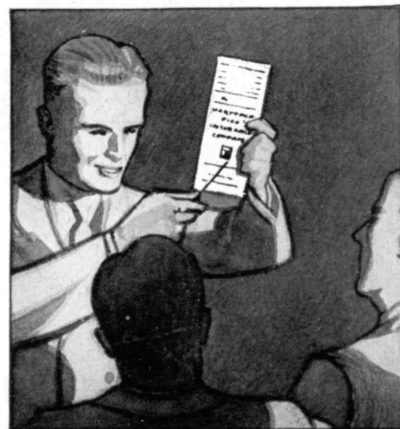
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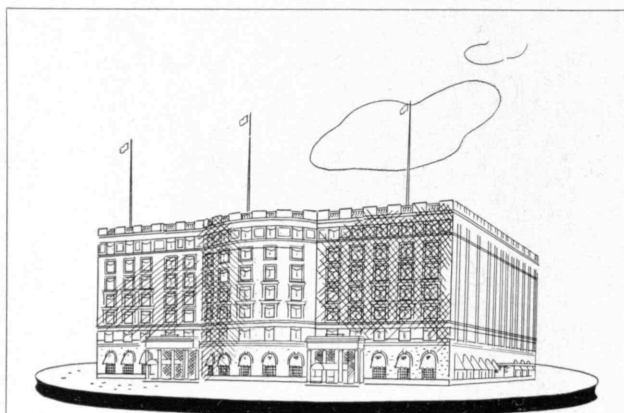
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## BIOLOGICAL ENGINEERING

(Continued from page 347)

the body under treatment. In the same department there has been inaugurated a study of the effect of high-speed electrons upon a living cell, a search for fundamental knowledge of the destructive action of radiations on live tissues. Artificial radioactivity is being used in collaboration with local medical authorities to study an obscure process of nutrition.

The spectroscopy laboratory is coöperating with local physicians in the detection spectroscopically of traces of metals in blood and other body fluids as an aid in diagnosis of disease and its cause, such as anemia in children or selenium poisoning of Western livestock (see page 328). It has also coöperated with the Biology Department in the study of foods suspected of containing small quantities of undesirable metals.

The high-voltage group in physics will soon be in a position to produce usable quantities of artificial radioactive materials which will open the way to a most interesting program of physiological investigations with these materials together with neutrons and x-rays, which may well be centered in the Biology Department and involve coöperation with local hospitals.

The Electrical Engineering Department has designed and produced an improved form of electrocardiograph which is installed in one of the Boston hospitals. It has recently built a new instrument made as an electrocardiotachometer, reference to which has been made. This department has also devised the electric impedance comparator for measurement of resistance and reactance of living tissues. The use of this latter device in the Massachusetts General Hospital and the Lahey Clinic has suggested certain correlations between objective measurements and endocrine disorders in the human patient, and is being used at present in certain hospital investigations and diagnoses. It will also be investigated in connection with experimental animals used in bio-assay of vitamins and hormones in the hope that it will permit the recognition of diagnostic symptoms.

In material equipment, competent personnel, and co-operative spirit of staff members, the Institute is prepared to embark on the proposed program with unsurpassed initial advantages, and with a momentum gained from manifold activities that have been described above.

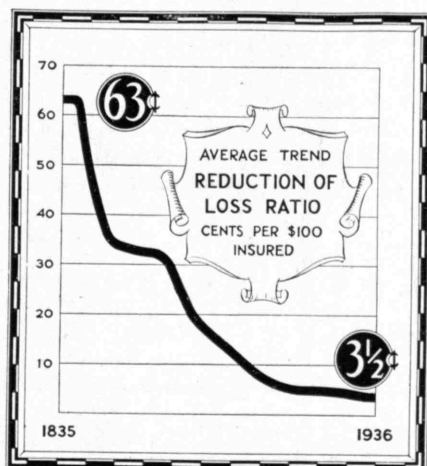
The excellent tradition of effective work in applied biology at the Institute has been maintained since the beginning of the pioneering work of the late Professor Sedgwick. His department became the first school of public health, and under the impetus of his fundamental work in sanitary disposal of sewage and the purification of water there was established at M.I.T. the first course in America in sanitary engineering. Since Sedgwick's death the Department of Biology has created the first courses in food technology and industrial biology, and has established a sound position in biochemistry.

For all of the above reasons, the time is ripe for launching a formally recognized research and educational program in biological engineering. The new educational program is centered upon a course of (Concluded on page 382)

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"Shortly before my wife and I returned to America, the small Chinese city in which our hospital was located was raided by one of these robber chieftains, and we feared we would be wiped out completely.

"At the time of this raid I was in the hospital washroom shaving and, as has been my custom for years, using Barbasol. Suddenly the door to the washroom was thrown open and, as I turned, there appeared in the doorway a hairy giant of a man—roughly dressed—dirty, and a scraggly long growth of beard or rather hair on his ugly, cruel-looking face.

"Evidently he had neither heard of the practice of shaving nor had he seen such an operation in his whole life before, for he stared at me in great surprise and interest.

"I noted his hesitancy and, though I was literally seething on the inside with fear, I managed to remain fairly calm and continued my shaving.

"A thought flew through my mind. Maybe I could capitalize upon this bandit's growing curiosity and render our predicament less foggy, for a lot of China's so-called bad men are but children at heart, and can be handled accordingly.



• Suddenly—there appeared in the doorway a hairy giant of a man

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"When I had finished shaving, this bandit made signs toward his own face. (I did not know his dialect and therefore could not talk with him.) Here was an opportunity indeed! A sort of childish eagerness replaced the hardness in his eyes. He was about to satiate his curiosity and male vanity.

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"I thoroughly prepared the bandit's face and by no means spared the Barbasol. I spread it on generously. When I finished, I showed him how to use the razor and he gave himself a fine shave with remarkable ease, considering his inexperience. I then made him a present of the razor and a tube of the cream.

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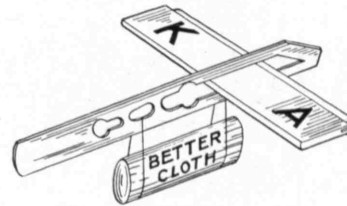
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## BIOLOGICAL ENGINEERING

*(Concluded from page 376)*

study which officially becomes Course VII-A in the forthcoming issue of the catalogue for the academic year, 1937-1938. This Course covers five years (and one interim summer) and leads to the degree of master of science in biological engineering together with bachelor of science in biophysics as of the preceding year.

With a simultaneous approach from biology and from physics, the new curriculum leads through chemistry, physics, mathematics, electrical engineering, and biochemistry to specialized work in biophysics and in biological engineering. It provides liberal opportunity in the later years for electives in specialized subdivisions of the major field.

In introducing the healthy pedagogical youngster, "Biological Engineering," we are not announcing its birth, but rather its christening. Course VII-A is not "just one more course of study" that someone happened to think of; its creation is the result of experience, and is in response to increasing student interest in its borderline fields of science. Its adoption by the Faculty in the face of an announced objective of reducing the multiplicity of existing numbered Courses of study, is entirely consistent with an axiomatic biological principle, namely, that pruning dead wood from a tree is for the purpose of encouraging sound new growth.

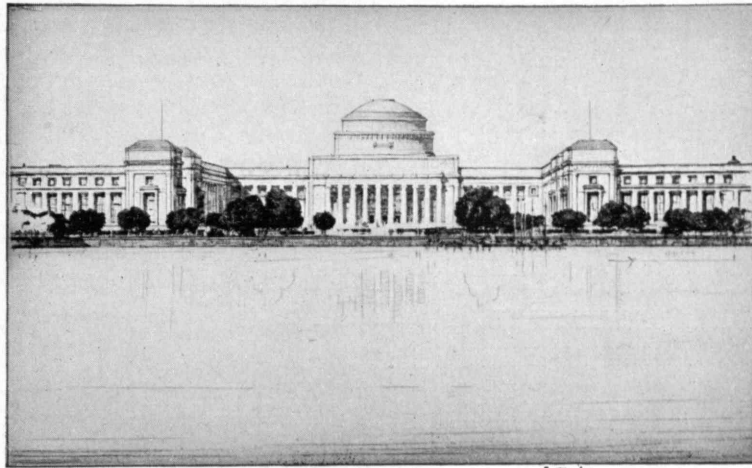
## TREND OF AFFAIRS

*(Continued from page 331)*

the Germanic hordes that swept away Western Rome are widely regarded as being controlled in volume by Malthusian factors and in direction by the path of least resistance. That path was determined in this case by the fact that the newly built Great Wall of China prevented expansion eastward; desert and mountain barriers prevented progress southward; while to the west there lay an empire on the point of complete disintegration. Migrations, then, are symbols of human want and misery; population movements are often the eddies that follow the submergence of civilizations.

It is disquieting to realize, therefore, that in point of absolute volume, the hunger-driven, fear-lashed hordes of the 4th and 5th Centuries A.D. are paralleled by the migrations of the post-War years. More than 1,200,000 refugees, according to an official census which takes no account of those whose journeys were cut short by death, were driven into Greece from surrounding states from 1912 to 1928. All told, well over two million Greeks, Turks, Armenians, and Bulgarians were uprooted during that period. Another 1,500,000 Russians chose emigration instead of extermination after the establishment of the Soviet regime, according to Countess Waldeck in the April issue of *Foreign Affairs*. Recently the stream has broken forth anew. In 1932, 25,000 Assyrians were forced out of Iraq, while since 1933, the world has had dumped into its overloaded lap 115,000 refugees from Germany and a trifling 8,000 from the Saar. These numbers, probably totaling over four million, are unique in *(Continued on page 384)*

# *A Memorable Gift*



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*By Louis Conrad Rosenberg*

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## THE TREND OF AFFAIRS

(Continued from page 382)

modern times. True enough, Assyrians, Persians, Greeks, Romans, and Byzantines transplanted populations, or, where it seemed more convenient, killed them off; Spain expelled half a million Jews in 1609; and an exodus of as many French of the Reformed Church followed the revocation of the Edict of Nantes in 1685. But these movements were smaller, individually, and occurred before any popular conception of the rights of man had spread over the Western World.

The foregoing figures of post-War migration do not by any means show the magnitude of the drifts which have recently occurred and are still going on among present populations. Immense internal movements, so slow that their economic and social implications are frequently overlooked, are taking place in many countries. In this nation, the most striking is the tremendous flow of Negroes northward during and after the War, a curiously channelized flow rising mainly in Mississippi, Alabama, Georgia, and South Carolina, and feeding, for the most part, the big northern cities — New York, Chicago, Detroit, Cleveland, and Philadelphia. In point of actual numbers, however, this does not equal what is perhaps the largest single movement in the history of the country, the drift from Eastern and Central United States into California, which assumed large proportions after 1900 and continued until at least 1930.

Out of this category are planned migrations such as the evacuation of areas flooded by TVA activities and the settling of Alaskan valleys under government supervision. Holland had the similar task of populating areas exposed by the Zuyder Zee drainage, while England is struggling with the gigantic problem of shifting stranded populations from counties forsaken by industry. It takes an autocracy, however, to do such things in the grand manner. Russia under its last few czars made internal migrations the cure-all for every economic and political ill afflicting it. Without benefit of technological unemployment, czarist Russia managed to accumulate a surplus peasant population of over twenty million. From 1800 to 1914 some 5,500,000 of these souls moved into Siberia, taking with them the ignorance and inadequate farming methods that had caused their hunger. Four million of them remained. The U.S.S.R. has also conducted large-scale (Concluded on page 386)

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# SCIENCE *for the* LAYMAN

*"The trouble with much of what is called popularization of knowledge," John Dewey once noted, "is that it is content with diffusion of information, in diluted form, merely as information. It needs to be organized and presented in its bearing upon action. Here is the most significant phase of the obligation incumbent upon the scientifically trained men . . . of our age."*

Because The Technology Review seeks to discharge this obligation, because it provides its readers with a more realistic picture of the techniques, and the new ways of living and thinking nurtured in laboratories, because it adds to its science columns the third dimension of interpretation it has rapidly come to be one of Science's most quoted spokesmen.

By its emphasis on science in action, by its revelations of unexpected beauty in the modern world created by science, *The Review* draws increasing numbers of readers to its pages and commands a steadily widening circle of attention.

The Technology Review  
*The Magazine of Science in Action*

A collage of newspaper clippings related to synthetic biology. The most prominent headline reads "USE OF SYNTHETIC ATMOSPHERE". Below it, another headline says "Technology Review Tells of Relief of Diseases". Other visible fragments include "from science arise than acts", "sh, form...om com...", "tion", "r pr...", "at...", "Technology R...", "in an ar...", and "Atmos...".

is be Scientists  
Joseph Mayer  
REVIEW

# TECHNOLOGY REVIEW

# Seeing Solid

from The Technology Review

by a quick movement in  
If you come within an  
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A man with only one eye  
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learn to determine de  
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## Planes for Gold Mi

By *John J. Rowlands*

cerpts from the Technology Revi

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**A Billion Wild Horses**  
By STUART CHASE  
From the Technology Review

Decoration by  
for "Men and  
Stuart Cha



## THE TREND OF AFFAIRS

(Concluded from page 384)

experiments in shifting man power, and in spite of much more careful planning, has met with indifferent success except where economic favors were granted. One reason for the Soviet's eagerness to see its population on the move is the fact that in 1928, 97% of its people lived in 25% of its area—the southwest sector—while European Russia contained 96% of its large-scale industry. Another reason, common to many other nations, is the need of protecting thinly settled frontiers.

Any comparison of present and ancient migrations is robbed of a good deal of its significance, however, by the effect of science and discovery on population growth. Some measure of that growth is indicated by the relatively expert guess that Italy under Augustus had approximately one-sixth the population of Italy under Mussolini. Other estimates place the population of the world in 1650 at 465,000,000; in 1850 at 1,100,000,000; in 1929 at 1,820,000,000. Migrations in past centuries, therefore, even when smaller numerically than those of today, represented higher intensities of displacement.

But consideration of such ratios offers scant comfort to the millions who find little to choose between the rational inhumanities of governments and the apparently irrational savagery of nature.

## MAIL RETURNS

(Concluded from page 320)

There are but few institutions where a man may indulge in sports for their own sake, i.e., where they are his main interest, and the intellectual or professional pursuits are secondary. There are always some who may indulge in such a luxury or who are preparing for a career in professional sports or in physical education. The fundamental aims and objects of the M.I.T. do not provide for such groups. Nor is it in accord with the principles of education followed at the Institute to encourage any one sport or athletic interest to such a degree that it becomes a center for the college spirit and the athlete becomes the great hero of the hour, such that the basic ideal of the student body is warped. All honor to the man who triumphs in athletic sports at M.I.T. There is a thrill in it for him and for all his schoolmates. He has done something that should help him win in the competitions of later life, whether it be with individuals or with adverse conditions. He has done something to build up his morale and give him confidence in himself. It will always stand him in good stead.

There are a number of sports well adapted to conditions at the Institute. No one has ever hit upon a better thing than the sailboat enterprise which has in it so many of the elements desirable in good physical education. However, sailing is a good-weather sport and is not adapted to the winter months which take up most of the Technology season.

The purpose of this letter is to bring out the advantages of fencing without in any way detracting from any of the other suitable sports. Fencing is one of the very oldest and most honorable of sports, dating back hundreds of years. At the present time, the weapons and methods generally used are conventionalized; they are light and the action is faster.

Fencing is essentially, though not exclusively, an indoor sport and is thus particularly adapted to the months of inclement weather. Fencing does not require excessive space, nor

are the facilities and equipment expensive. Not much time is required to prepare for this exercise and thus no time is lost unnecessarily. The exercise is milder than some sports and yet is vigorous enough to develop the muscles and to require deep breathing. It is an exercise which tends to develop good posture, self possession, and to eliminate awkward movement or poses.

Fencing is a sport for a man with brains as well as muscles. The moves must be carefully thought out and practiced, under a competent instructor, of course. There are many combinations of action. To perceive them the eye must be trained, and more than that, the automatic reactions must be developed by long practice. The reactions then become faster than the eye can see and are due to the feel of the blade and to subconscious thought. The lunge, the advance, and the retreat are excellent exercise for the legs and the body muscles. The work with the weapon itself develops the hand, wrist, arm, shoulder, and body muscles.

There are three types of weapons now in general use: the foil, which is for thrusting with only the torso as a target; the épée, which is also for thrusting but with any part of the body, limbs, or head as target; and the saber, which is both a thrusting and a cutting weapon with the body, arms, and head as targets. There is much to be learned and the weapons are usually taken up in the order named.

Proper clothing must be used for protection while fencing. This includes mask, gloves, jacket, and trousers of suitable material and design for the weapon concerned, and also shoes for proper footwork. Fencing is one of the safest of all sports, and bodily injury is a rarity.

Fencing requires above all perfect coördination of the various parts of the nervous and muscular systems. It tends to give poise and graceful movement. It does more than that: It brings out power of automatic reaction to given situations. It will help a man to save himself when he might otherwise be the subject of an accident—avoid a fall, move out of danger—or he may save others due to his quick reactions. Fencing is an exciting and exhilarating sport. It has all of the advantages of competition. This will not only bring out the superior fencers but will also show each individual under what circumstances he can do his best.

Fencing has always been a gentlemanly sport. Courtesy and fairness are inherent in the game. One of the great advantages of fencing is that a man can indulge in it for many years after he would be required to give up some of the other popular sports. There are many men fencing at the ages of 50, 60, and even 70 years, who do well and get much fun out of it. The fencer also gets experience in judging and umpiring in competitions. This is difficult and requires a quick eye and knowledge of the rules. It develops also a sense of fairness, justice, and decision.

There is hardly a sport that is so well adapted to Technology men as fencing, both for the benefit during the study years and for what it will mean later. It is the one sport in which Technology should have the best chance to make a showing in competition with other colleges and institutions.

## Tomorrow's Homes

THE PAPERS PRESENTED AT THE

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## HAPPY DAYS

The Class of 1937 has been fortunate in maturing at a propitious moment.

Industrial opportunities have been numerous, and in many instances demand has exceeded the supply.

To the fortunate Class of 1937 we extend our best wishes for continued good fortune, and remind you that the successful placement of future classes will be facilitated by the records you establish.

To the employers who have made this placement record possible, we extend our thanks, and hope their faith in the Institute will be rewarded.

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## The Parade Starts

1,242

... Alumni have reported that they hope to attend Alumni Day

393

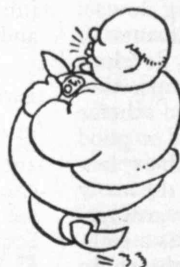
... Alumni have made definite reservations

507

... say they will bring their wives if they come

All of which is a pretty statistical way of saying that it appears as though June 7, the Alumni Festival at Technology, is going to be like the circus we went to the other night — gay, heckle-raising, and speedy, and with the house *jampacked* with satisfied, peanut-munching customers.

The conference on "The Homes of Tomorrow," the Jamboree Dinner, the Class Reunions, not to mention that general tropism toward Technology that's getting more and more prevalent, seems to be drawing 'em in, in greater numbers than ever. Is *your* reservation in?



## Last Minute Announcement!

A feature of the Jamboree Dinner at the Hotel Statler, Boston, on the evening of Alumni day will be the first showing before a large group of the new Polaroid stereoscopic motion pictures. Here is a rare opportunity to see a preview of what the movie of tomorrow may be.



N. B. The Class of 1917 challenges any other Class to a Sailing Regatta on the Basin at 4:00 P.M. Dinghies aplenty will be available. Get in touch with Walter Wood '17, M.I.T. Nautical Association.



# TECHNOLOGY MEN IN ACTION

CHECK LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

## *Course IV Men in the News*

❑ JOHN TAYLOR ARMS '11, whose new book, "Design in Flower Arrangement," written in collaboration with his wife, Dorothy Noyes Arms, was published this spring by The Macmillan Company. Long recognized as the "dean of American etchers," Mr. Arms has for many years been president of the Society of American Etchers. He is also a member of the National Academy of Design and an associate of the Royal Society of Painter-Etchers and Engravers of England. In our issue of last February, *The Review* was privileged to reproduce one of Etcher Arms's plates, "Louviere Lace," which he exhibited at the etching show held during the past winter in New York City.

Commented the Boston *Herald's* book reviewer on Mr. Arms's latest literary endeavor: "This new book is one of the valuable contributions to the literature of adapting flowers to various indoor environments in appropriate containers. It develops the fundamentals of composition through a carefully prepared scheme of geometrical planing, based on good proportion and balance, with explanatory drawings to illustrate the many photographs of approved arrangements which are shown. It is a technical study of this vast and absorbing subject. . . . [Mr. Arms] makes no claim to being a horticulturist. . . . But he does introduce into his arrangements the principles of true art, and thereby lays down certain lares and penates in the craft without which an arrangement loses its definite standing as a truly artistic creation."

❑ EDWARD D. STONE '27, whose design of a guest house for Henry R. Luce, President of Time, Inc., won for him the silver medal in domestic architecture awarded in connection with the 51st annual exhibition of the Architectural League of New York, April 22. The jury, whose membership included EDGAR I. WILLIAMS '08, made this comment on Mr. Stone's design: "A distinguished and refreshing handling of a country residence relating with great charm the exterior surrounding to the house."

❑ SIDNEY WAUGH '27, whose design of a glass medal for the winner of the competition sponsored by the Pittsburgh Glass Institute is the first competitive award ever made in glass. However, since the aim of the competition was to bring before the public notable examples of the work being done in glass as a medium for solving contemporary problems in architecture, decoration, and design, it was only fitting that the winner should receive a medal in glass.

In an interview with the *Christian Science Monitor*, Mr. Waugh reiterated his loyalty to his chosen field of sculpture, but expects to continue to work in glass. He feels that one reason for the growing importance of glass is its adaptability, both structurally and technically; it turns out to have a greater range than almost any other material and the wonder is that it wasn't thought of earlier. In using it designers are pulled away from sharp angularities, for glass is inherently a flowing material, soft and fluid, yet strong in line.

## *Laureled Staff Members*

❑ THOMAS ADAMS, research consultant in city planning, who has been chosen to design the new improvement scheme for the city of Dundee, Scotland.

❑ VANNEVAR BUSH '16, Vice-president and Dean of Engineering, who was among 30 new members elected in April to the American Philosophical Society. HENRY BRYANT BIGELOW '00, Professor of Zoölogy and Curator of Oceanography at Harvard, was also elected at that time.

❑ GEORGE B. HAVEN '94, Emeritus Professor, who was honored at a dinner given by members of the textile committee (D13) of the American Society for Testing Materials at the Hotel Biltmore, Providence, R. I. The dinner was in recognition of Professor Haven's many contributions to the textile industry.

❑ JAMES F. NORRIS, Professor of Organic Chemistry and Director of the Research Laboratory of Organic Chemistry, who is the recipient of this year's annual medal for notable service to the science of chemistry, awarded by the American Institute of Chemists on May 15. To quote the

New York *Times*: "Maximilian Toch, president of the institute, said the award was made in recognition of Dr. Norris' 'outstanding service as a teacher and as an investigator.' His chief activities in research in recent years have been in the study of the reactivity of atoms and groups in organic compounds and the effect of substituents in a molecule on the reactivity of the groups studied."

❑ SAMUEL C. PRESCOTT '94, Dean of Science, and the late W. LYMAN UNDERWOOD '98, lecturer in biology and public health, who receive deserved tribute in a new book by A. W. Bitting, "Appertizing." Says Author Bitting: "The canners of this country owe more to Prescott and Underwood for placing their industry upon a scientific basis than to any other investigators. Their work covered a period of about ten years, dealing with the fundamental principles of bacteriology and their applications to factory operations. . . ."

## *We Offer Congratulations*

❑ TO FRANCIS R. HART '89, President of the United Fruit Company, who on April 9 became the 13th president of the Massachusetts Historical Society. Another officer elected at that time was GEORGE EDWARD CABOT '83, who became a member-at-large of the society's council.

❑ TO ALFRED P. SLOAN, JR., '95, who is now chairman of the policy and administration committees of the General Motors Corporation. These new committees, created at a meeting of the corporation's board of directors on May 3, replace the finance and executive committees.

❑ TO SAMUEL B. ROBERTSON '99, who has just been elected president of the B. F. Goodrich Company.

❑ TO LOUIS S. CATES '02, upon whom was conferred the honor of Commander of the Ordre de la Couronne by the King of Belgium, April 15.

❑ TO SELSKAR MICHAEL GUNN '04, Vice-president of the Rockefeller Foundation and Director of the foundation's public-health work in the Far East, who delivered the 13th William Thompson Sedgwick Memorial Lecture on April 23 at M.I.T. His subject: "Public Health in China."

¶ To WHITFORD DRAKE '11, who was elected president of Electrical Research Products, Inc., a subsidiary of the Western Electric Company, at the annual meeting of the directors on April 13.

¶ To ROBERT E. WILSON '16, who recently became president of the Pan American Petroleum and Transport Company, the American Oil Company, and their subsidiaries.

¶ To ERIC HODGINS '22, former managing editor of *The Technology Review*, who has been appointed publisher of *Fortune*. His appointment is in line with the new policy of management decentralization recently announced by Time, Inc., publishers of *Fortune*.

¶ To ALAN E. CAMERON '26, Professor of Mining at the University of Alberta, who has been appointed deputy minister of mines for Nova Scotia.

¶ To JOSEPH LEVIS '26, who regained the national foil championship at the New York Athletic Club on April 28.

### Extracurricular Staff Activities

¶ KARL T. COMPTON, NORBERT WIE-  
NER, MANUEL S. VALLARTA '21, ROB-  
LEY D. EVANS, JOHN G. TRUMP '33,  
and ROBERT J. VAN DE GRAAFF were  
among those who gave papers before  
the National Academy of Sciences in  
Washington, D. C., April 26 to 29.  
At the meeting of the American  
Physical Society which followed  
that of the Academy, papers were  
contributed by the following mem-  
bers of the staff: GEORGE G. HARVEY,  
PHILIP M. MORSE, LEONARD I. SCHIFF  
'36, EDWARD J. SCHREMP '34, WAYNE B.  
NOTTINGHAM, CHESTER M. VAN ATTA,  
ROBERT J. VAN DE GRAAFF, LESTER C.  
VAN ATTA, DOYLE L. NORTHRUP '31,  
ROBERT B. KING, and ALEXANDER S.  
LANGSDORF, JR., '35.

¶ FLOYD E. ARMSTRONG, Professor  
of Economics, addressed the members  
of the Chelsea (Mass.) Rotary Club  
on the subject: "What Did America  
Say on November 3?"

¶ FRANCIS BITTER, Associate Profes-  
sor of the Physics of Metals, is the  
author of a book, "Introduction to  
Ferromagnetism," published last month  
by McGraw-Hill Book Company,  
Inc.

¶ THEODORE SMITH, Professor of  
English, is a newly elected member of  
the council of the Foreign Policy  
Association.

¶ ROBERT W. VOSE '31, instructor in  
photoelasticity, gave a lecture on  
skating, April 16, before the Newton  
(Mass.) Figure Skating Club.

### It Is Reported

¶ By the Warren Telechron Com-  
pany, of which HENRY E. WARREN '94  
is president, that during 1936 clock  
hands purchased from one source  
alone required five tons of steel and  
two tons of brass.

¶ By the Associated Press that an  
instrument which is said to be the  
answer to the problem of safe blind  
landings for aircraft has been de-  
veloped by FRANK G. KEAR '27 and  
Gomer L. Davies. The instrument en-  
ables a pilot to slide his plane down a  
curved glide path from a height of  
3,000 feet to a smooth contact with  
the ground. Following it in fair  
weather or foul is a comparatively  
simple job of maneuvering the craft  
until two instrument needles are  
squarely crossed, then holding them  
in that position. Development of the  
device became possible when the two  
men discovered how to project radio  
waves in a pencil-like beam curving  
upward from a point on the airport  
runway.

### Reprinted

¶ From the *Journal of Engineering  
Education*, March, 1937, an article  
entitled "Massachusetts Institute of  
Technology" by WILLIAM H. TIM-  
BIE, Professor of Electrical Engineer-  
ing. The purpose of the article is to  
acquaint members of the Society for  
the Promotion of Engineering Edu-  
cation with the general background  
of the M.I.T., since the Institute is  
to be co-host with Harvard at the  
society's convention in Cambridge,  
June 28 to July 3.

¶ From *Power Plant Engineering*, an  
article "The Automatic Diesel Plant;  
Is it Practical?" by GEORGE B.  
BAILEY '22, President of the Thermal  
Engineering Company of Boston.

### DEATHS

\* Mentioned in class notes.

¶ JULIUS SUSMANN '76, April 11.\*

¶ GEORGE FAUNCE '82, February 10.\*

¶ CHARLES S. L. KENNEDY '84,  
March 13.

¶ FRANK ADDISON BEAN '87, Octo-  
ber 23.

¶ FREEMAN CROSBY '87, April 30.

¶ CHARLES H. VINTON '87, April 6.

¶ LAWRENCE HORTON '88, April 26.

¶ GARDNER VOORHEES '90, March  
18.\*

¶ LEONARD C. WASON '90, April 30.  
At the time of his death Mr. Wason  
was president and treasurer of the  
Aberthaw Company, builders of the  
Harvard Stadium, the Christian Sci-  
ence Mother Church, the Squantum  
destroyer plant, the troop shipyards  
in Alameda, Calif., and the Provident  
Institution for Savings Building in  
Boston. He was very prominent in  
the civic affairs of his home town of  
Brookline, Mass., and is a former  
president of the Concrete Institute.

¶ MARY W. RICHARDSON '91, Feb-  
ruary 7.

¶ WILLIAM A. TUCKER '93, May 1.

¶ ROBERT H. FERNALD '94, April 24.  
Dr. Fernald was dean of the Towne  
Scientific School of the University of  
Pennsylvania. From the *New York  
Times*: "Dean Fernald had conducted  
investigations for the United States  
Geological Survey and the Bureau of  
Mines; had served as consulting engi-  
neer to various official bodies; and  
had made a study of the problem of  
conserving natural resources. . . .  
Dr. Fernald served at the Case School  
of Applied Science and at Washing-  
ton University, St. Louis, until 1912  
when he came to the University of  
Pennsylvania as Whitney professor  
of engineering and director of the  
department of mechanical engineer-  
ing. Pennsylvania conferred the  
honorary degree of doctor of sci-  
ence upon him in 1924. . . . He  
was joint author with George A.  
Orrok of 'Engineering of Power  
Plants'. . . . He was a former presi-  
dent of the Cleveland Engineering  
Society. . . ."

¶ GEORGE ROCKWELL '95, April 8.\*

¶ SHELDON HOWARD '97, March 9.

¶ JAMES F. LEARY '98, April 8.\*

¶ MARY A. TILTON (Mrs.) '99, May  
1.

¶ DONALD E. BENT '12, March 6.

¶ ISRAEL CAIGAN '12, March 23.  
In his will, Mr. Caigan left a \$200,-  
000 trust fund, allotting one third of  
it to the M.I.T.

¶ HAROLD D. WALKER '12, April 17.  
Since his graduation, Mr. Walker  
had been a practicing architect in  
Boston with the exception of the  
World War years when he served in  
the United States Navy. He held  
membership in the American Insti-  
tute of Architects and the Boston  
Society of Architects.

¶ ABE MARSHALL LOEB '13, April 8.\*

¶ ROSS D. SAMPSON '13, April 11.\*  
(See also notes of the Technology  
Club of Chicago.)

¶ JOSE W. LOUBRIEL '24, February  
14.

¶ DONALD W. HOWE '25, February  
13.



# NEWS FROM THE CLUBS AND CLASSES

## CLUB NOTES

### *Technology Club of Chicago*

With deepest sorrow the death of Ross D. Sampson '13, III, is announced. Mr. Sampson had been president of the Club for the last three years and will be much missed. Funeral services were held on April 13 at the Scott Funeral Chapel in Evanston, Ill. Interment was at Memorial Cemetery in Wilmette.

Sampson had been an active leader in the Club even prior to his presidency, coming to Chicago in 1922. Previously he lived in Buffalo, N. Y., where he held office, likewise, and gave an abundance of enthusiasm to the Buffalo club affairs. He leaves his wife, Maude E. Sampson, and two magnificent sons, Willard A. and Richard D., who are students and are on the football team at Annapolis.

No words can measure the staunch loyalty and nobility of Sampson — loyalty to his splendid family, his business, and to us of M.I.T. May the warmth and good-fellowship of his spirit ever guide us! — EDMUND G. FARRAND '21, *Secretary*, 1290 Old Colony Building, Chicago, Ill.

### *Dayton Technology Association*

The Association has been holding regular monthly luncheon meetings on the second Saturday of each month at the Engineers' Club since last December. The first meeting was a general get-together when plans for the year were discussed. At the January meeting the Association enjoyed two reels of the Edgerton high-speed photographs furnished by the Alumni Association. These films were not only instructive but extremely interesting.

In February, A. W. Stevens, noted stratosphere expert, addressed the meeting with an informal talk on his experiences in balloon construction and stratosphere flights. The speaker for the March meeting was Commander Klein, United States Navy, retired, who talked on the subject of "The Future of Heavier-than-air Craft." Commander Klein included in his talk some very amusing and exciting incidents which had occurred during his navigation of some of the big Navy dirigibles.

At the April gathering of the Association, E. B. Newill, chief engineer of the Frigidaire division of General Motors Corporation, discussed the new refrigerants developed by Frigidaire. Mr. Newill's talk was accompanied by a very interesting experimental demonstration in which everything from flowers to goldfish was used, the latter contributing immensely to the amusement of the audience. During the business meeting

the new officers for 1937-1938 were elected: President, P. H. Rutherford '21; Vice-president, L. W. Bugbee, Jr., '21; Secretary-Treasurer, J. C. Morse '14. Meetings will be discontinued during the summer months and will be resumed in October at the Engineers' Club. — LESTER N. STANLEY '32, *Secretary*, 434 Grand Avenue, Apartment 13, Dayton, Ohio.

### *Detroit Technology Association*

The Institute's newly appointed dean of humanities, Edwin S. Burdell '20, was the speaker at the Club's annual meeting on Friday evening, April 23, at the University Club. Professor Burdell did not confine himself strictly to his subject, "Problems of Humanistic and Liberal Education in an Engineering School," but discussed many of the recent developments and changes at M.I.T. He also included in his talk some of his very interesting cases as a former parole officer. — JOHN E. LONGYEAR '26, *Secretary*, 2000 Second Avenue, Detroit, Mich.

### *Technology Club of Hartford*

Professors Locke '96 and Schell '12, guests of honor at the March meeting of the Club — held at the City Club on March 19 — were welcomed with a display of enthusiasm surpassing anything shown in recent meetings. Attendance reached a peak for the year, with more than 40 men turning out, including a delegation from the Springfield area led by Pop Constantine '26. Also present was Charlie Smith '00, Past President of the Alumni Association, who came from New Haven to greet his old friend, Professor Locke.

Following the dinner, during which our ebullient cheer leader performed his quaint baptismal ceremony for the benefit of the guests, Professor Locke spoke briefly, bringing greetings from President Compton. He also ran a reel of the latest Edgerton stroboscopic pictures. Professor Schell then followed with the colored films taken of the dinghy fleet in action on the Charles, which drew a variety of comments and questions from the gathering. Professor Schell, with good-natured repartee, stood off the barrage of questions until finally even Doc Osborn '15 conceded the victory to the visitors and adjourned the meeting. We hope Professors Locke and Schell enjoyed it as much as we did! — GEORGE A. FOGG '26, *Secretary*, 164 Wethersfield Avenue, Hartford, Conn.

### *Technology Club of South Florida*

Those who missed the March 22d get-together lost out on an excellent meeting. All those attending will testify favorably on this score. Our visitors expressed them-

selves as having enjoyed an interesting and entertaining evening. Mr. Eugene O'Brien presented a splendid discourse. He was happy to find his former teacher, Professor Clinton H. Currier of the mathematics department at Brown University, in Miami on vacation and able to be our guest at the meeting. The five-minute speakers, William D. Sargent '87 and Edgar A. West, added much to the program, as did the visitors at the speakers' table. It was a large evening for the Club and for members of the engineering fraternity of the Miami area. The Florida Engineering Society, the American Institute of Electrical Engineers, and the American Society of Mechanical Engineers were well represented.

Club members on hand included William D. Sargent '87, Albert H. Clark '22, John W. Hoover '32, Charles S. Symonds '35, Clarence P. Thayer '23, Harry R. Gamble '26, Wilfred S. Hale '09, John H. Fessenden, Jr., '22, Arthur Laidler-Jones '22, William A. Boland '36, Thomas P. Coogan '24, G. Murlin Drury '35, William E. Parker '99, Fred E. Zurwelle '20, Ray C. Burrus '22, Alexis B. Kononoff '29, Myron L. Williams '32, J. Coleman Jones '23, Jack D. Preston '23, Elizabeth F. Fisher '95, George E. Batcheller '10, and Edgar A. West.

The following visitors were present: W. Y. Adler, M. D. Ebert, H. N. Fairbanks, Carl Lambert, H. M. Stainton, R. H. Young, William Sydow, I. L. Murray, S. H. Dix, C. V. Booth, G. C. Estill, John Fitch, C. Beenson, J. H. Clouse, J. McL. Jenkins, C. K. Lingo, J. P. Warren, W. H. Davidson, K. Stiefel, J. W. White, Clinton H. Currier, P. J. Carlin, J. B. Hiers, Jr., Maurice Connell, W. D. Fuller, S. B. Kent, Gale M. Smith, C. A. Young, M. B. Garriss, B. Kononoff, O. J. Sieplein, Eugene O'Brien, L. R. Stephens, and Mrs. M. I. Flagg.

We appreciated receiving word from several of the absentees: T. J. Hails '23 had to be in Birmingham. John H. Read '23 was called to Baltimore on account of Mrs. Read's illness. George C. Westervelt '06 found himself in California (of all places) on the night of the meeting. B. Howard Brown '30 was detained in the northern part of the state. Morris Lipp '20 had returned too recently from the hospital to venture out. An addition to the family kept Edward I. Mandell '21 at home. Professor George Rutledge of the mathematics department at the Institute sent us a note to the effect that he was in town and would join us, but unfortunately he was not present at the meeting.

The newspaper publicity about the meeting brought us a new member, Harry R. Gamble '26, IV. He is associated with Mr. Russell Pancoast, Miami Beach architect. G. Murlin Drury '35 introduced Mr. Gamble, which means that Drury's new-member record jumped to two. It is too



bad that each member hasn't introduced two new members! The Alumni Office at the Institute has sent us cards introducing additional Technology men in this area: James B. Magenis '29 of 736 Majorca Avenue, Coral Gables; Lawrence G. Ropes '19 of 1311 Alhambra Circle, Coral Gables; Luther E. Gilmore '05 of 221 North O Street, Lake Worth; Arthur Esner '21 of 1510 Pennsylvania Avenue, Miami Beach. Another card told us that Howard C. Judson '03 resided at 251 North Coconut Lane, Palm Island, Miami Beach. Our invitation to Colonel Judson brought a prompt response, but he regretted that he could not attend the dinner meeting.

Our roster lists five Tech men at Pan American Airways, Inc. Of this number, William A. Boland '36 reported present at the meeting. We hope that more of them will fly in next time. — We will long remember the pleasure of meeting Elizabeth Fisher '95. It is to be regretted that the rest of the membership missed hearing the story of her first days at the Institute. It made us all feel good to learn her opinion of Technology and Technology men. We sincerely hope that Miss Fisher will be with us at each meeting.

The remarks of many of our visitors indicated the general belief in the need for an engineering fraternity organization in the Miami area. Much may be accomplished in the public's interest through the cooperation of engineers. The Club and its members will surely welcome the opportunity to take part in an association of engineers that will further the interests of the profession. In these days there is need for engineering leadership.

When you read that interesting article about the beautiful botanical garden of Ernest C. Cole in a Sunday issue of *Miami News* did you recall that he was graduated from M.I.T. in 1881? — CLARENCE P. THAYER '23, *Secretary*, 1760 Northwest 41st Street, Miami, Fla.

### *M.I.T. Club of Northern New Jersey*

The third of the Club's series of annual banquets was held on April 7 at the Newark Athletic Club with 186 enthusiastic Alumni and guests to celebrate the visit of President Compton and Alumni Secretary Locke '96 as guest speakers. As at our organization dinner two years ago, Dr. Compton was most heartily welcomed by Frank B. Jewett '03, President of Bell Telephone Laboratories. The high spot of the evening was the announcement by President Compton of the plans to build a new School of Architecture as a part of the Cambridge group of buildings and to dispose of the Boston property. Dr. Compton presented a very complete summary of present-day activities at Technology and discussed at some length the proposed increase in tuition, student housing, and the operation of the plan for stabilization of enrollment.

Professor Locke gave a splendid example of his ability to entertain Alumni of all Classes with old and new experiences in

his travels as alumni secretary. As an added feature, Jim Ellenwood of the Y.M.C.A., well known as a service club speaker, kept everybody in continual laughter with his arraignment of all alumni dinners. With his humorous indictment of his own Colgate and Columbia alumni functions, Mr. Ellenwood presented seriocomic comments on the dangers that beset middle age.

Rufus E. Zimmerman '11, Vice-president of United States Steel Corporation, ably discharged the duties of toastmaster. President W. I. McNeill '17 presided at the brief business session which preceded the speaking portion of the program. Short reports from the Secretary, Treasurer, and the Nominating Committee were presented. William J. Orchard '11 entertained with piano and accordion selections, and John H. Teeter '22 led the songs and cheers. Professor Vladimir Karapetoff of Cornell University, a guest of Rosalie M. Cobb '23, was presented to the club members and expressed his appreciation of the evening's program.

The officers elected include: Everett W. Vilett '22, President; William J. Lutz '23, Carole A. Clarke '21, and Gordon G. Holbrook '10, Vice-presidents; A. Raymond Brooks '17, Secretary; Freeman B. Hudson, Jr., '34, Assistant Secretary; John H. Wills '26, Treasurer; William B. Coleman '24, William J. Grady '22, Clayton D. Grover '22, John M. Keck '23, Arthur W. Lunn '09, Winfield I. McNeill '17, J. Frank Maguire '17, Milton M. Manshel '22, Joseph P. Maxfield '10, Alfred I. Phillips, Jr., '10 and Edmund J. Thimme '23, Executive Committee; Frank B. Jewett '03, Rufus E. Zimmerman '11, Allan R. Cullimore '07, and William J. Orchard '11, Advisory Committee.

The Club was represented at college nights at Teaneck and Bloomfield high schools. On April 23 and 24, Assistant Dean Pitre assisted the scholarship committee and Honorary Secretaries in interviewing the 31 applicants for the Northern New Jersey regional scholarship which was awarded for the first time this year. — A. RAYMOND BROOKS '17, *Secretary*, Wayside, Brantwood, Summit, N.J. FREEMAN B. HUDSON, JR., '34, *Assistant Secretary*, Colgate-Palmolive Peet Company, 105 Hudson Street, Jersey City, N.J.

### *M.I.T. Club of Northern California*

As the falling sun closed upon a beautiful spring afternoon the last day in March, a score of Tech Alumni and their wives invaded the lovely campus of the University of California at Berkeley, and made their way to a sheltered greenhouse where Professor of Plant Nutrition, W. F. Gericke of "grow your plants without soil" fame, pointed out to the group his banana and papaya trees, cantaloupes, tomatoes, gardenias, sweet potatoes, and squashes, all grown in water solutions of the essential salts, without soil. (See *The Review* of April, 1936, p. 262.) Since all present sought to gain information and technique which could be applied to their

own horticultural endeavors, e.g., the plot of gardenias in the front yard, the hour spent in the greenhouse was, needless to say, of interest to everyone.

When darkness fell, the group, augmented by then to a strength of half a hundred, retired to the Faculty Club to capitalize upon the culinary instincts which had been aroused in the "laboratory." Following an excellent dinner, a short business meeting was held, under the guidance of Chairman Richard Piez '29, for the annual election of officers for the ensuing year. When the smoke had cleared, those elected were Richard Piez '29, President; Robert S. Clark '06, Vice-president; Frederick B. Barns '14, Treasurer; and Scott C. Rethorst '36, Secretary.

Attention was next turned to the Speaker of the evening. By means of rapid physical rearrangements, under the direction of George Whittle '08, a screen and a slide projector were produced, and with Vice-president Folsom '18 in charge of slides, images of huge plants were thrown upon the screen at the whim of Professor Gericke, who increased our awe with the size of his plants (his tobacco plants necessitated the removal of the greenhouse roof to permit full growth) and with his statistics of the tons of fruit or produce grown per acre. These numerous slides of plots of various plants convinced us that the several small commercial ventures along the lines of Professor Gericke's experiments might look for a promising future. Following the slides many inquiring minds put forth a lengthy and complete set of questions, the climax of which was the question: "Is it necessary to stir the water?" And notwithstanding the answer that it was not, the remark timidly came forth that stirring could be accomplished by putting fish in the water, whereupon George Whittle audaciously proclaimed: "That's efficiency." At this point the defense moved to rest.

It was extremely gratifying to all to be a part of this large turnout, and thanks are due to Professor Gericke for an extremely interesting evening. Appreciation by all is also extended to George Whittle, not only for the original idea but for the faultless arrangements as well. And it is a pleasure indeed to recall that several of those present renewed old friendships that had lain dormant for as long as a year. The newly elected officers have received from several sources the suggestion that the practice of holding a Sunday outing be rechristened. To the success of such a party, we look forward. — SCOTT C. RETHORST '36, *Secretary*, Columbia Steel Company, Russ Building, San Francisco, Calif.

## CLASS NOTES

1876

We regret to report that Julius H. Susmann passed away on April 11, and we quote here from a Boston newspaper: "Julius H. Susmann, consultant engineer with Adolph Lewisohn and Sons Com-

*Plan to attend Alumni Day at M.I.T. on June 7*

1876 Continued

pany of New York and a former Boston and Newton Highlands resident, died . . . at Hotel Suburban, East Orange, N. J., where he made his home. He was born in Boston on August 24, 1855, attended the local schools, and was graduated from the M.I.T. with the Class of 1876. He served as a mining engineer with the Canadian Pacific Railway Company for many years before he became affiliated with the Lewisohn Company.

"His wife, who died about 20 years ago, was Miss Jane Harris of Boston. He leaves a daughter, Mrs. Bernard J. Hogue of Providence, R. I., a granddaughter, Mrs. John Barnes, Jr., of Philadelphia, and a sister, Mrs. Joseph Meinrach of Kansas City." — CHARLES T. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass.

## 1882

Word has been received of the deaths of two members of the Class: George Faunce passed away on February 10; Harry W. Jones has also gone, but the date of his death is as yet unknown to the Secretary.

In a roundabout way we have learned that our classmate, Clara P. Ames, still keeps her interest in Technology affairs, for she recently purchased a copy of "His Mark" by Robert H. Richards '68. She is, by the way, the oldest alumna of M.I.T. and Professor Richards is the oldest alumnus.

The Assistant Secretary is about to depart again to wander over the face of the globe. She and her adopted daughter sail on June 20 for Austria, where they will spend their summer vacation on a mountain lake in Carinthia. In September they will journey to Turkey, where Grace will study at Istanbul Woman's College next winter. Rachel expects to teach in one of the American Board girls' schools, probably in Merzifon, Turkey.

We regret that our Secretary is so far from his usual health that he felt obliged to turn the preparation of these notes over to the Assistant Secretary. — ALFRED L. DARROW, *Secretary*, 39 Garrison Road, Brookline, Mass. RACHEL P. SNOW, *Assistant Secretary*, Care of Dr. Samuel E. Pond, Marine Biological Laboratory, Woods Hole, Mass.

## 1888

Ben Buttolph makes his annual tour of the country every spring, regardless of drought or flood. This year he visited New York, Philadelphia, Washington, Huntington, W. Va., Cincinnati, Chicago, and Toronto. In Cincinnati, he interviewed our classmate, Charles Merrell, and talked with him about the flood and his job as county commissioner. Merrell's company is building a very handsome new factory, as their old plant is to be taken over by the city on account of several highway changes. Ben also called on Dr. Victor Ray, Jr., son of our classmate, who passed away quite suddenly recently. Ben was in Cincinnati during the flood of 1913 and was obliged to use a boat to make some of his factory inspection trips, but this time he drove through the same area on dry land.

Sometimes news travels slowly; this was the case when it required over two years for the death of our classmate, Walter H. Underwood, to be reported to the Alumni Association. Underwood died of angina pectoris on December 16, 1934, at 3647 West Flagler Street, Miami, Fla. As his wife died prior to his death, your Secretary was unable to obtain any details of his later years.

We hope all men of '88 are making their plans to come to the class dinner, of which you have received notice, as well as to attend Alumni Day on June 7. It should be an unusually interesting Alumni Day, for our friends of '87 will be there in full force, celebrating their 50th anniversary of graduation. We should take notes so that when our turn comes next year we can outdo them in friendly rivalry. 'Eighty-seven was a great Class for doing things while at Tech, and doing them well.

Your Secretary's eldest daughter, Dorothea, has just been appointed librarian of the Pliny-Fiske Library of Railroad and Corporation Finance at Princeton University. She is to begin her duties there on August 1. For the past three years she has been connected with the new South Hall Library of Columbia University in New York City. His second daughter, Katharine, wife of Eldon Cunningham Mayer, lieutenant in the United States Navy, left Annapolis on May 22 with her husband and two children for San Pedro, Calif., where Lieutenant Mayer is attached to the U.S.S. *Argonne*, flagship of the Pacific fleet, which will carry on maneuvers up and down the Pacific Coast this summer and possibly sail on a cruise to Australia next winter. Sallie, the Secretary's youngest daughter, wife of James Robb Hughes, Jr., official of the Utica Savings Bank, Utica, N. Y., has just been made a member of the Junior League.

Your Secretary returned with Mrs. Collins from Annapolis to Chebeague Island, Maine, the latter part of April, after another month of "youth-renewing" activities. He took full advantage of the fact that his shipmates of the Spanish-American War on the U.S.S. *Scorpion* are now rear admirals to renew his acquaintances with naval officers on duty at the Naval Academy and to play golf with them on the naval officers' golf course, attend all baseball, lacrosse, tennis, track, and rowing events, and in general enjoy all the advantages of a naval officer on shore duty at the academy. Dress parade for the governor general of Canada was a grand event, with 2,400 midshipmen and all the officers in their full-dress uniforms with cocked hats and medals, side arms and gold braid, drum and bugle corps and marine band. It would stir the blood of any real American, even if he were an extreme pacifist, to see these young midshipmen, the flower of the whole country, in their military maneuvers.

Your Secretary got considerable kick out of seeing Navy beat Harvard and Michigan at baseball, as well as out of going over to Washington to see the cherry blossoms on 703 cherry trees given us by

Japan 25 years ago. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine.

## 1890

Another of our well-known classmates, Gardner T. Voorhees, passed on, at Palm Beach on March 18. The early part of the winter he was in the vicinity of New York but had gone South for his wife's health and to get a little rest. Born in Stamford, Conn., he attended schools in Somerville, Cambridge, and Newton, Mass., before entering M.I.T. where he was graduated from Course II. For about ten years he was with the Quincy Market Cold Storage and Warehouse Company during the time of the installation of the brine pipe lines which cool the market district of Boston. In 1901 he went into business for himself at 53 State Street and installed the first air-circulating cooling system at Lowney's Chocolate factory. Among other installations were those at the Boston Athletic Association and the Massachusetts General Hospital. It was probably during this period that he had the experience of freezing a whale, the story of which has furnished amusement at our reunions.

In 1904 Gardner was in charge of refrigeration at the St. Louis World's Fair, and later he established himself in the vicinity of Chicago. He was the delegate of the United States government to the first International Conference on Refrigeration in Paris, and also to the second conference in Vienna. There are a number of inventions to his credit and he also was the author of several books on refrigerating machines and refrigeration. He was a member of the American Society of Mechanical Engineers, American Society of Refrigerating Engineers, the Engineers' Club of New York, the Salmagundi Club of New York, and was a 32d degree Mason. In 1910 he married Miss Ninette C. Chretien in New Orleans, who survives him, as does also his sister, Mrs. Sidney M. Arnold of Palm Beach. Blessed with imagination and vision, he was helpful in the development of his profession and will be much missed at our reunions where we could depend on his being present whenever possible.

Laurance J. Carmalt, whose address is now 261 St. Ronan Street, New Haven, Conn., has an interesting article in *Civil Engineering* for March concerning rural zoning and highway improvement. An inquiry from the Secretary brought the statement that while practically retired he continues to be active in civic work, being chairman of a civic development committee in the town of Hamden, and also chairman of the public reservations committee of the Connecticut Forest and Park Association. He writes: "In general I make myself a busybody, delving into various municipal matters, but, so far, I have been received politely by the active managers, and I have not succumbed to the temptation of writing letters to the newspapers."

At the First International Conference on Therapy the French government had its consul general of New York confer



## 1890 Continued

membership in the Legion of Honor upon Willis Rodney Whitney who invented the radiotherm, a high-frequency electrical device for creating artificial fevers in sick people. Whitney has a communication in the *New York Times* of April 18 in which he states his belief that cancer can be eradicated by coöperative research, and that progress could be accelerated by a central research organization to which information and ideas might be referred. Just before this Dr. Langmuir had delivered his highly important address on the chemistry of films formed when fatty acids or oils spread on water. Whitney feels that Langmuir's molecular-film work supplies a missing link in the study of growth.

*Time* announced recently that a life-sized portrait of Charles Hayden had been hung in the south lounge of Peacock Alley at the Waldorf-Astoria in New York in commemoration of his association with the hotel as chairman of the board of directors of the new Waldorf since its formation in 1929. The portrait was painted by Paul Trebilcock. The Acting Secretary, recently in New York, strolled through this alley and, failing to find the portrait, inquired for it at the office of the manager. It seems that Charlie never had his portrait painted from life and this has been prepared from photographs, a difficult task at best. It was brought out, and to the writer it failed to convey the impression of hearty friendliness combined with forceful ability that he associates with Hayden. Others, more intimate, have suggested changes and the portrait will be touched up and returned.

Announcement of the birth of a granddaughter, Ann Dickerman Hetzel, April 7, comes from Darragh de Lancey. — GEORGE A. PACKARD, *Acting Secretary*, 50 Congress Street, Boston, Mass.

## 1892

Your Secretaries are indebted to the Chicago *Economist* for the following account of Henry John Schlacks, whose office is at 840 North Michigan Avenue. He was born in Chicago, the second oldest of nine children, completed his education in the public schools, and worked in a drafting room under a brother of Louis H. Sullivan '74, chief clerk, who was employed by Mr. Schlacks's father, superintendent of machinery for the Illinois Central Railroad. As the younger Schlacks had a bent for architecture, the office of Louis Sullivan was suggested as training ground and there he went as an apprentice and in three years was placed in charge of the office. Schlacks remembers Louis Sullivan as a cultured gentleman, a fine man on his feet as a speaker, a person of very strong personality, attractive looking but dictatorial: "His was the kind of spirit which traveled alone. He quit the Beaux Arts in France because its ideas were foreign to his temperament. I don't believe his art developed to full flower until he was 40 years old, but working in his own style, which expressed the Oriental rather than classic feeling, he was the leader in the world

and his influence is felt in Germany and France, both of which countries honored him."

Mr. Sullivan's numerous and varied examples may be viewed at close range in Chicago where buildings from his design are in active use, among them the Garrick Building, the retail department store building now used by Carson, Pirie, Scott and Company, whose beautiful filigree iron entrance on State Street gives pleasure to the eye, the Auditorium, the Stock Exchange Building at the southwest corner of Washington and LaSalle Streets, the Grand Opera House, and others.

Theaters were frequent projects and included Hooley's, the revamping of the Haymarket, and the thrice reconstructed McVicker's. Each year Mr. Sullivan's office was architect for the transformation of the interior of the old exposition building which stood on the site of the Art Institute and in which Adelina Patti sang. All types of work were handled in the drafting rooms of Adler and Sullivan, where Mr. Schlacks remained from the age of 16 to 20 years. When he was leaving the firm, Frank Lloyd Wright was just starting his training there and was destined to carry on the traditions of Louis Sullivan. Further education was gained by Mr. Schlacks at the M.I.T. where he specialized in church architecture during his two years there, after which he toured Europe in company with Eleazer B. Homer '85 of the M.I.T. staff, traveling and studying architecture in England, Italy, Germany, and France, viewing ecclesiastical masterpieces.

Many years later he was present at the Institute's alumni banquet in Chicago when a former professor, C. Howard Walker '99, by that time 70 years old, was guest of honor. When the old lecturer's banquet speech concluded, Mr. Schlacks's wife suggested that her husband renew acquaintance with Professor Walker. Mr. Schlacks demurred, thinking the gentleman would long since have forgotten him — "thousands of personalities having passed under the teacher's observation since then" — Mr. Schlacks reminded her. The lady pressed her point and he approached the elevated speakers' table and recalled himself to his former professor who did not recognize him for the moment and asked him his name. When Mr. Schlacks mentioned it, Professor Walker told him he had indeed been true to the leanings of his student days at the Institute — 40 years previous. Mr. Schlacks explained that part of the instruction consisted of a monthly project. Each pupil submitted a design and finished drawing of a project which was placed on the wall for criticism by the instructor. Professor Walker immediately recalled to his group at the speakers' table that whatever project Mr. Schlacks had prepared, whether it be office, railroad terminal, or house, it always had a steeple and was reminiscent of a church.

Consistency of this nature in his chosen field of endeavor is borne out by Mr. Schlacks's career, which includes 100 churches in Illinois and neighboring

states — some for Roman Catholic and some for Protestant groups — exclusive of rectories, convents, and similar religious structures. Since a man is known by his work there are many edifices in Chicago which call attention to the quality of Mr. Schlacks's endeavors. Among them are St. Mary's of the Lake Church, North Sheridan Road and Buena Avenue; St. Ignatius Church, Glenwood and Loyola; St. Ita's Church, Broadway and Catalpa; St. Paul's Church, West Twenty-second Place and Hoyne Avenue; St. Adalbert's Church (following the style of St. Paul's in Rome), West Seventeenth and Paulina Streets; and St. John of God, Fifty-second Street and Racine Avenue. St. Paul's church is vaulted in brick and its entire interior is of brick and mosaic.

Henry D. Shute writes from Miami, Fla.: "I have received your two advance notices about the 45th reunion. Had hoped to attend this year's — it would have been my first — but I am building a permanent home down here and as the house will not be done until July, I feel that I should stick around and see, with my Course VI knowledge, that the electric bells ring properly. With regret I have pulled up my stumps from Pittsburgh, where I toiled for 40 years, and now instead of being a Damnyankee shall become a Florida Cracker." — Chas. Hudson Bigelow reports his activities as follows: "I have been with the bridge division of the New Jersey Highway Commission since April, 1929, checking railroad accounts that are building underpasses at the state expense. I see Charles Chase of Tufts and C. McL. Stoneman about once a year at the American Society of Mechanical Engineers convention in December, and looked up Charles A. Beal in Montclair, N. J., last fall. I have two boys, both married, and a daughter who has five children, so we are grandparents."

J. Scott Parrish wrote your Secretary, saying: "I wish to thank you for your class letter of March 15 and I am very glad to see that you are evidently reading the Bible. John III, Chapter I, second verse, covers beautifully the present situation. 'Beloved, I wish above all things that thou mayest prosper and be in health, even as thy soul prospereth.' I wish this for all the members of our Class, and I hope to be able to attend the class reunion at Harwichport, June 4 to 6." — John W. Hall, plagued by a persistent case of jaundice, is at Peter Brent Brigham Hospital, Boston, for observation. He writes in wry humor as follows: "A friend remarked that the jaundice made one feel blue and I said that the blue feeling combined with the yellow of the jaundice ought to make one feel green and young." We hope he will soon return bright and smiling.

We are all appreciative of Billy Kales's generous and cordial invitation to assemble at his summer home in Harwichport, Cape Cod. He and Mrs. Kales will be ready to receive members of the Class on the afternoon of Friday, June 4, as announced in the letter already sent out by Kales to all members of the Class. —

*Plan to attend Alumni Day at M.I.T. on June 7*



## 1892 Continued

JOHN W. HALL, *Secretary*, 8 Hillside Street, Roxbury, Mass. W. SPENCER HUTCHINSON, *Assistant Secretary*, Room 8-219, M.I.T., Cambridge, Mass.

## 1894

The report of the Astrophysical Observatory of the Smithsonian Institution at Washington for 1936 has just appeared. If members of the Class will carefully read this report, they will get therefrom a résumé of Charlie Abbot's theory of a 23-year cycle in the variation of solar activity and matters dependent thereon. Incidentally, if any members of the Class have kept a diary of weather conditions since the time we were graduated, it might be possible to check up on this cycle theory. Abbot states that the theory is reasonable and tenable and is abundantly evidenced in such matters as weather, the rise and fall of the level of the Great Lakes, droughts and other climatological phenomena.

Isaac Weil, whom the Secretary last contacted in Washington in War time, is again located in the Capitol City with an address at 3500 14th Street, Northwest. The information as to his location did not include any suggestion as to his activities so I am unable to state whether or not he is still in the War Department.

Sterling Cousins, who from time immemorial has been a native son of the great state of California, has returned to it after living for the last year or two at Salem, Ore. I suppose Sterling could not find himself so much at home in the Willamette Valley as in the hills and dales of his native state. His present address is Larkspur, Marin County, Calif.

It is with much regret that I must record the death of two members of the Class: Nathan C. W. Chapman, who died February 17, and John W. Tarbox, the date of whose decease is not available. Both these men will be readily remembered by those who were with the Class from the beginning. Nathan Chapman and his brother, John, came from Hyannis, Mass., entered in the freshman year and went through the regular four years. After graduation, Nathan was occupied around Boston for a time and later went to other parts of the country. He never paid special attention to class notices and the only information the Secretary could get in regard to him was an occasional item from his brother. In recent years, he had been living at Oaklyn, N. J., and had not been in the best of health. A notice of his death in February was received from his wife who kindly informed the Alumni Office.

The information regarding the death of John Tarbox was received from the Theta Xi Fraternity which he joined in the freshman year. Tarbox dropped out of the Institute after the second year and since that time his locations and the positions which he has occupied have been unreported. It will be recalled that he was one of the officers of the Class during the freshman year and was quite prominent in its affairs. The sympathy of the Class is extended to the families of both these men.

The Secretary happened to be in Portland, Maine, on April 27, and called at the office of Ned Hunt, commissioner of public works for the city of Portland. Unfortunately Ned had just left the office, and so what might otherwise have developed into a miniature '94 reunion, was nipped in the bud. It is very evident, however, from information received that Hunt is doing a fine job as commissioner of public works for this enterprising city. — SAMUEL C. PRESCOTT, *Secretary*, Room 10-405, M.I.T., Cambridge, Mass.

## 1895

George A. Rockwell, patent attorney with offices at 101 Tremont Street, Boston, died suddenly on April 8. The funeral was held at the home of his sister, Mrs. William J. Walton, 106 Bowdoin Street, Dorchester, Mass., where he had previously lived. He was a member of the Boston Bar Association, the Boston Patent Bar Association, and the Catholic Alumni Sodality. Burial was in Holyhood Cemetery, Brookline, Mass.

Word has been recently received of the death, on February 20, of Arthur Gibson Bixby, who resided at 2631 Harvard Avenue, Seattle, Wash. Bixby was born in Brookline, Mass. After leaving Technology in 1892, he spent two years at Boston University Law School and later traveled around the world twice. In 1915 he joined the staff of the *Seattle Times* and continued therewith up to the time of his death. While Bixby spent but two years at the Institute he was always affiliated with '95.

Margaret Winifred Dorrance, daughter of our late classmate, Jack Dorrance, was married April 9 to George Strawbridge of Philadelphia. — Alfred P. Sloan, Jr., President of General Motors Corporation, has established a foundation to aid economic research, which he plans to endow personally. The foundation was incorporated on July 6 in Delaware as a non-profit membership corporation and at present it is supervised by his brother, Harold S. Sloan. The plans are not to set up its own research organization, but for it to be underwritten and handled by established institutions. Research projects of a functional nature as opposed to those dealing with abstract phases of economics will be considered in the plan. To illustrate his meaning, Sloan states that a consumer's problem possesses a functional study base within the tentative scope of the foundation's definition, while an abstract research problem would be one seeking a possible correlation between price levels and wars.

It is emphasized that this attitude should not be interpreted as a disparagement of scholarly research; rather it represents a feeling that studies bearing directly upon human relations and "devoted to the increase and diffusion of economic knowledge," which is the slogan of the foundation, should be considered first in distribution of financial assistance. A board of permanent trustees will probably be drawn from among Mr. Sloan's friends. It will be interesting to follow this development. — LUTHER K.

YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

## 1896

During the latter part of March, Rockwell attended the National College Wrestling Championship meet at Terre Haute, Ind. When that was over he swung around to Harriman, Tenn., to see his family, and thence on to Pinehurst, N.C., to join Joe Driscoll and check up on Joe's golf. He and Joe returned to Boston together. During the month of April, Fred Damon went to Florida to get himself in good golfing trim. Rockwell reports that he recently has had contact with Ralph Henry, who is in the architectural business in Boston, and Ralph has, in the course of over 40 years, developed from the slight individual he was as a student into a man of substantial dimensions.

Dean Lobdell '17 of M.I.T. made a tour of Texas to attend the Convention of Deans of Colleges and Universities, and he came back with the report that in the Plaza Hotel in San Antonio on March 31, he ran across Bert Spahr, who with Mrs. Spahr and son, Kim, had been on an automobile tour to Mexico City, and was returning home to Massachusetts.

The steamer on which the Fullers were to sail to Australia finally departed, and thus was ended their delay of a month at Singapore, which they had occupied by side trips to Borneo, Java, and elsewhere. The last report from them was from Sydney, Australia, where they had arrived on Washington's Birthday, after a trip of 15 days from Java. This trip was not specially eventful, although many interesting observations were reported.

Joseph Milton Howe died on March 22 in the Herman Hospital at Houston, Texas, after a brief illness. He was a graduate of Course I in our Class and, as a student, was active in Civil Engineering Society, the Andover Club, the Southern Club, and the Sigma Chi Fraternity. After graduation he spent a year at the University of Texas Law School. He was born July 30, 1874, in Houston, the son of Milton Grosvenor and Jessie Briscoe Howe. He married, December 11, 1901, Miss Rowena Thompson, and a son, Knox Briscoe, was born on November 26, 1903. Mrs. Howe passed away on April 11, 1935. The son is located at present in the office of the firm of Howe and Wise. Howe was with the Santa Fe Railroad in 1897-1898, acting engineer maintenance of way on the Houston and Texas Central Railway 1899 to 1903, office engineer on the Southern Pacific, 1903, and consulting engineer in Houston from 1903 down to the time of his death. The firm of Howe and Wise was organized in 1909. During the War he was consulting engineer with Horton and Horton Gulf Coast Irrigation Company and Texas Gulf Sulphur Company, building and maintaining roads to and in Camp Logan and Camp Ellington, increasing the sulphur output for munitions. He was a member of the Houston Club, University Club, Rotary

1896 Continued

Club, and Engineers Club, and the Museum of Fine Arts. He was president of the Oakland Realty Company, vice-president of the Houston National Bank, and trustee of the Herman Hospital Estate. He was a member of the American Society of Civil Engineers and in this organization served as national director for three years and as vice-president for two years. He was instrumental in the organization of the Texas chapter of that society and during his lifetime had held every office in the chapter. He was also a member of the American Association of Engineers, in which organization he was district director in 1927.

He naturally went into the railroad and construction lines as his father was one of the engineers in the construction of the Houston and Texas Central Railroad. As a consulting engineer he had engaged in many construction enterprises, including railways in Mexico, highways in the United States, and scores of other projects. Many of the fine highways in his part of Texas were built under his supervision. He became a prominent civic leader of his community, and the same attractive personality and rugged honesty which we associated with him as a student, together with his technical skill, made him an honored and respected citizen of wide reputation. In 1907 he built the Monclova and Panuco Mountain Railroad in Mexico. It was our good fortune to have Howe with us at one of the reunions in Osterville. He had such a good time that he promised to reappear every five years, but he failed to come in 1931 and 1936, not because of lack of desire but because pressing business affairs demanded his attention, much to his disappointment and ours.

*These notes will appear in print prior to Alumni Day celebration at M.I.T., Cambridge, on Monday, June 7. Headquarters for the class that day will be at the office of the Secretary, Room 8-109, M.I.T. — CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge, Mass.*

## 1898

With the death of Roy Peavey on March 25, we have suffered a loss which we shall feel keenly at all of our future class gatherings. He was dependable. We do not recall a single local meeting nor a class reunion that he did not attend. His genial presence was always an inspiration to the rest of us. He was equally dependable in his business affairs and in his church affiliations, which latter consumed a very large share of his energies. He never obtruded his religious convictions upon his classmates, but attending his funeral, at his church in Malden, Mass., it was borne upon us what a strenuous worker he had been for his church and how he had endeared himself to the congregation which packed the church. It will be remembered that he suffered a paralytic shock about two years ago. This caused his retirement from business, but in spite of his crippled condition he had managed to attend class gatherings.

The following clipping is from the Boston Globe: "Leroy Deering Peavey, 61, for many years President of Babson's Statistical Organization in Wellesley Hills, died this morning at his home, 108 Marshall Street, Watertown. Born in Exeter, N. H., he joined the Babson organization nearly 30 years ago and became a vice-president and general manager in 1910. When Roger Babson, founder of the organization, retired from active service, Mr. Peavey was made president. He was graduated from Phillips Exeter Academy in 1894. The same year he moved to Malden with his family. He entered the M.I.T. and was graduated as a civil engineer in 1898. He was employed by a Boston engineering concern until he joined the Babson organization. He retired two years ago. He was interested in church work and the study of genealogy. He was active in the Gideon Society and for many years was treasurer and superintendent of the First Nazarene Church in Malden. He, at one time, was a member of the general board of the denomination and a treasurer of Eastern Nazarene College. He was a member of the Executive Club of Boston, and while at Babson Park wrote numerous newspaper articles. Surviving are his wife, a son, four daughters, and four grandchildren. . . ."

We have to record the passing on April 8 of another classmate, James F. Leary, whom we did not know so intimately but who was equally dependable and faithful in his field of secondary school education. We quote from a Worcester paper: "The long career as both teacher and administrator of James F. Leary, 61, organizer and principal of the Worcester Continuation School, was this morning ended by death from a heart ailment, in his home, 13 Beaconsfield Road. He had been ill since Monday morning when, for the first time since his appointment to the Worcester school department as a manual training teacher in 1907, he was forced to absent himself from his school duties. One of the veteran members of the Worcester school department, Mr. Leary had only two assignments over a span of 30 years: one, as teacher of manual training for 13 years; the other, as public school principal for 17 years. He was the first and only principal of the Continuation School, a vocational training school, on Sycamore Street, having aided in its organization, in accordance with state legislation, prior to his promotion.

"Mr. Leary, born in Bath, Maine, the son of the late Patrick J. and Mary Conway Leary, lived in Boston as a youth. He was graduated from Boston Latin School in 1894 and studied mechanical engineering at M.I.T. . . . He obtained practical experience later, to give him balance as he instructed boys in the manual arts, being employed during his college vacations by various manufacturing concerns as well as by the Technology service shops in construction and cabinet work. After he received his degree, he was for five years an instructor in mathematics and science at M.I.T. In 1905, he was appointed manual training teacher at Holyoke, and taught in the public schools

there two years, prior to appointment in Worcester. Not content to enter the teaching field with only his engineering education, Mr. Leary did summer work at Harvard University in 1905 and 1906, taking advanced courses in mathematics and physics. Later, while teaching here, he studied education and psychology at Clark University during the summer schools of 1916, 1917, and 1919. In the latter year he received a bachelor of arts degree. He forsook study in the summer of 1918 to do government work for the United States Shipping Board at Portsmouth, N. H., in the cost and progress department."

On Saturday evening, April 24, we had one of the most enjoyable local dinners of our Class. The great attraction was Harold Jones, whom we have scarcely seen since our graduation. We had managed to learn of his visit to Boston long enough in advance to arrange for the dinner. Although with his usual modesty he was far more interested in hearing what we all had been doing than in telling of his own accomplishments, we managed to find out many interesting events in his life, and the exchange of opinions between him, George Treat, George Cottle, Ed Chapin, and others was worth coming to hear. Besides those just mentioned, there were present Ernest Russ, Bob Draper, John Dodd, Fred Dawes, Bill Perley, Henry Sullivan, Henry Scott, Charlie Smith, M. deK. Thompson, Elliott Barker, Arthur Blanchard, and Roy Chamberlain '31, who was the guest of George Treat.

Great enthusiasm for the 40th reunion which comes a year hence was felt by everyone. George Treat outlined some of his plans for getting a large number of classmates together. All present agreed, at George's suggestion, to write to Lester Gardner, the other member of the committee, to assure him of the enthusiasm for the reunion and of their desire to cooperate. The addresses are: 251 West 101 Street, New York, N. Y., for Lester D. Gardner, and 200 Devonshire Street, Boston, for George W. Treat.

Arthur Blanchard had just returned from the convention of the American Chemical Society at Chapel Hill, N. C., where he had contributed a paper on "The Volatile Metal Carbonyls" to a symposium on complex compounds. — Ed Chapin displayed some photographs of The Himalaya sent by his daughter who is in India. He also displayed a massive tome in French, her doctor's thesis, on a phase of French history. She is the recent bride of a member of the Harvard faculty, and they are on a world tour, both studying history.

George Cottle is planning a motor tour of England this summer with his three sisters. He had with him a letter from Bill Stevens who writes from 3421 Goldfinch Street, San Diego, Calif., in part as follows (it will be remembered that Stevens spent many years in the Orient as architect for Standard Oil): ". . . You will note that our address is still the same. I believe I wrote you that we bought a small bungalow in the Mission Hills

*Plan to attend Alumni Day at M.I.T. on June 7*



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district, to park in while we got acquainted with the locality and looked for a permanent home. We still like it, though it seems a bit cramped, both as to house and garden, after the spacious place we had so long in Japan. Mrs. Stevens has a Japanese gardener, part time, and the place looks different since we have had it. There were a thousand small things to be done to make it fit us, and put it in first-class condition, and I have done those, myself, taking my time about it. So I have just about got around to a larger matter, though not so very big after all, *i.e.*, the building of a workshop — down the canyon slope that cuts a rear corner off the lot — with a one-room bath-kitchenette affair on top of the shop, at the garden level — Japanese style, if I can get the right materials. That will come later. There are quite a lot of concrete foundations, retaining walls, steps, and so on, to be worked out before even the shop can be built. When the project is complete we will be able to put up a guest (or two) in it, with full comfort and a desirable degree of privacy for them and for us. The bungalow would not permit us to do this with comfort to either party. Hope the little house may be an inducement to you to get around here sometime. . . .

We have also a letter from Paul Johnson, who is rooting for the 40th reunion: "I am pleased to note that you had some very interesting class notes in the April Review, and thanks a lot for the free advertising of my motor yacht logbook. I have had a rather busy and tame winter at home, but, at the end of February, I piloted *Seyelyn II* up to Seattle and left her there to get ready for summer charters to Alaska. Just to keep my hand in on the radio . . . I took down the radio phone transmitter, which had not been working properly for months, to see if I could find the difficulty. I found the trouble in one of the variable condensers, repaired it, and reassembled the set, taking about all day for the job with the ship rolling rather heavily. The transmitter has worked perfectly ever since. With it we are able to talk at night with yachts and shore stations over 2,000 miles away. The daytime range for good communication with telephone on ship through the radio stations of the telephone company is about 200 miles. If we desired, we could talk from the yacht 100 miles or so out at sea in the daytime and perhaps 500 to 1,000 miles at night to any telephone station in the world — Europe or elsewhere. With modern equipment, no one need be isolated from his fellowman, wherever he may be.

"My son, Seymour, who is chief operator of KFI in Los Angeles, has quite a powerful amateur radio station located on our property, with which he can communicate with amateur stations throughout the world and by voice across the United States. Unfortunately, amateurs are not permitted to communicate with ship stations and the Canadian government has repeatedly refused the yacht permission to communicate with amateurs. If we had this permission it

would be easy and cheap to communicate with the yacht daily or as often as desired.

"My plans are now made up for the summer. Mrs. Johnson and I will leave home on May 22, stop off two or three days at Aurora, Ill., and Milwaukee, Wis., and then go directly to Montreal, whence we will sail on the 28th on the S.S. *Duchess of Atholl* for Le Havre to attend the Rotary International Convention at Nice, June 6 to 11. There will be about ten ships sailing from this country practically full of Rotarians, and we expect it will be a great convention. After that we will sail on one of the rotary postconvention tours to the North Cape on the S.S. *Stella Polaris*, have a look at the Norwegian fiords and the midnight sun, then go back to England on June 29. We will meet at Plymouth, England, the Ancient and Honorable Artillery Company of Massachusetts, of which I am a life member by right of descent. With them we will tour Southern England and reach London on the 9th, where we will have a week of festivities with members of the Artillery Company of London who are celebrating their 400th anniversary. After that, still with the Artillery Company, we will take a short continental tour ending on June 25. We will then spend the rest of the time touring the British Isles in a leisurely manner and sail from Southampton on the S.S. *Queen Mary* on September 1. — It is my firm intention to participate in our 40th reunion in 1938, which is one reason we are not going through Boston on the present trip." — ARTHUR A. BLANCHARD, Secretary, Room 4-154, M.I.T., Cambridge, Mass.

## 1899

And now it can be told! Enough news has come to my desk, in one form or another, to put the Class back into The Review. The news supplied by members, plus bits I have garnered for myself, will put us in touch one with another for at least another change of the moon. This winter I ran across Lew Emery in New York City and found he was singing over the radio. In the same big city I encountered H. C. Greer, one snowy day, and found that he was spending the winter there with his family. He lives, however, in Morgantown, W. Va., the home of the state university. He claims for his state the most wonderful climate in the world, at least in that vicinity, where rivers and lakes abound. He is not far wrong — I have traveled that way often in the last decade, though I have not been fortunate in finding Greer in Morgantown when I was there.

S. A. Courtis, writing from the University of Michigan, Ann Arbor, told me he was the secretary-treasurer of a new magazine (he was taking on a headache) entitled *Growth*. The first number was due to issue in January. — Edwin A. Packard is now with Arthur Middleton, patent attorney, 570 Lexington Avenue, New York City, and W. E. Parker, formerly of Kensington, Md., and the Coast and Geodetic Survey of the United States government, has now retired from his

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survey post and removed himself and his household goods from Maryland to the state of Florida — land of eternal sunshine. He has built himself an electrified house at Fort Lauderdale (1100 Southeast Sixth Street), and will be delighted to see any member of the Class who treks that way. I had a pleasant time with him there this winter. Parker has had an opportunity to take stock of what is going on in this our own, our native land since leaving Uncle Sam, and he doesn't like some of what he sees. Like the rest of us, he doesn't know exactly what to do about it except ruminate.

From Parker I learned that Juan Real y Gaillard is still living in Santiago, Cuba. — Harriet Faxon writes that she resigned from the Metropolitan Museum of Art some time ago and is now living at 10 Mitchell Place, New York City. — From Ed Samuels came a note telling me that he attended the 75th anniversary dinner in Cambridge last June, but he told me nothing else about the meeting. — From Syracuse, N. Y., came news of W. C. Phalen who was in excellent health and spirits, and who said that he had seen Burt Rickards. The latter had called on him last autumn and was also in good health and spirits. — F. W. Grover and his wife motored 2,500 miles in England, Scotland, and Wales last summer and attended the annual pilgrimage to St. Botolph's, Boston, Lincolnshire, England. The pilgrimage was in recognition of the assistance given by New Englanders in the restoration of the old St. Botolph's Church at Boston, England. For seeing the sights off the beaten path in the "tight little Isle" there is no better way than motoring. Only thus does one see the real country and the real people, says Grover.

F. C. Waddell writes that he lives at 19 Whittlesey Avenue, East Orange, N. J. For two years he supervised and instructed a corps of engineers under the Coast and Geodetic Survey on a state-wide project of establishing monuments and bench marks for a correct system of boundary descriptions. But he could not stay away from the steel construction business and his office headquarters are now Bethlehem, Pa. He sees Hazard once in a while now. Their recent meeting, though, was the first they have had since both left Tech in 1899. Waddell also attended the 75th anniversary last June, and although six men from '99 were registered, he saw only Ralph Loud, with whom he spent an hour. He met Charles E. Smith on one occasion during the past year, and he reported also that Walter W. Wells has retired and lives in Princeton, N. J., with his daughter.

Rose A. Carrigan is principal of the first junior high school for girls in the city of Boston. — Bernard Herman visited D. C. Churchill in Berea last summer and reported a most enjoyable day. Churchill's business, he says, is unique, and the hand-loomed articles made by mountain girls after East Indian designs are exquisite.

Gardner Barry wrote most helpfully and aided in cleaning up the mystery of C. F. Wing's status. Wing was on my



## 1899 Continued

mailing list, but Uncle Sam returned all mail consistently. It appears that Charles Wing, Jr., is a '98 man and his name, occupation, and habitat are listed with that Class. I was very glad to have my list corrected, though sorry to lose a member. Incidentally, I have had many answers to my request for information as to the whereabouts of persons who have been among the missing for many years: From W. S. Newell I learned that James Douglas MacBride is now with the Maryland Dry Dock Company, Baltimore, Md. Newell writes further that his firm is employing nine M.I.T. graduates, two from the Class of 1936. — Haven Sawyer telephoned my residence on March 21, but I was out of town. — C. B. Cluff of Cincinnati called on me recently. We had a pleasant visit. Incidentally, he told me that he thought that Charles A. Torrey died several years ago. He had no other information. Has any other member confirming data? Cluff gave me some interesting firsthand information on the flood conditions in Cincinnati. He said that one could travel from the door of his office to the Ohio River — six miles — by boat.

From Tulsa, Okla., I received a card saying: "I can give you no information about any of the Class and mighty little about myself. You might change my address to 1529 East 17th Street." The card was unsigned. Page the author! — Clancey Lewis said he had no special news to give me, but he wanted to write me anyhow, so told me his old address was correct.

It is with regret that I list the passing of the following members: James A. Stetson, January 5, 1936; C. Howard Walker, April 12, 1936; Russell Gilpin, March 12, 1932; George H. Gleason, October 7; Harry George Johnson, February 26, 1933; John A. Flemings, 1932; Louis W. Shumaker, November 27.

Changes of address are legion. The following is a list which all will find helpful in keeping in touch with missing members: Merton A. Holmes, 68 Church Street, Watertown, Mass.; Gerard Riotte, Care of E. A. Pierce and Company, 400 Southwest Broadway, Portland, Ore.; R. H. Pinkham, Room 310 Union Station, Indianapolis, Ind.; Frederick W. Snow, Care of Archer E. Wheeler, 25 Broadway, New York, N. Y.; George C. Glover, 89 State Street, Boston, Mass.; Edwin B. Mead, 2618 Etna Street, Berkeley, Calif.; Harry W. Goldthwaite, 710 North 18th Street, Harrisburg, Pa.; John E. Congdon, 26 President Avenue, Providence, R.I.; Edward W. Sibley, 119 McKinley Avenue, Kenmore, N.Y.; A. Wallace McCrea, 201 East 40th Street, New York, N.Y. — W. MALCOLM CORSE, *Secretary*, 1901 Wyoming Avenue, N. W., Washington, D. C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

## 1900

The Boston *Globe* of March 8 carried a very interesting story of a real estate development off Beacon Street in the heart of Boston. It is to be a self-contained village of 100 homes within a town, a development rare in conception, the first of its

type in this country, and presenting a system that will appeal to city apartment-house residents who desire the atmosphere of secluded life in the country. It has been conceived by Charles A. Newhall. — Charles E. Smith has been in Boston recently, settling strikes and making speeches. His last address was in April, before the New England Traffic Club at the Copley Plaza, and dealt descriptively with the new equipment of the New Haven road. — Mr. and Mrs. Henry Dodge Bates '88 announce the marriage of their daughter, Harriet Osborn, to James Alfred Patch on Friday, the 16th of April, in the chapel of the Andover Newton Theological School, Newton Centre, Mass.

Notice has just been received of the death on August 15, 1931, of Albert L. Churchman, II, of Bridgeton, N. J. — We regret to report also the death of Thomas E. Penard, IV, of Arlington, Mass., on October 26.

Bowditch's son, Samuel, is a mining geologist with the Benguet Consolidated Mining Company at Benguet, Philippine Islands. He went out last September, and his wife and two children have just joined him after a very rough trip from Vancouver. Mrs. Ingersoll Bowditch went out with them as far as Vancouver and, after seeing them off, joined her cousin and had a very successful trip along the West Coast, stopping with friends at Yakima, Wash., San Francisco, and Santa Barbara. Returning, she stopped at Tucson and the Grand Canyon in Arizona.

Do not forget Alumni Day, June 7. We ought to have a class reunion also, just to keep in solution. There has been a marked precipitation recently, and something should be done about it. A different solvent or maybe an agitator is needed. What will you have? When you see this, telephone your nearest Secretary; let's mix up a little. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

## 1901

Before this June edition of *The Review* is in the mails we hope that a number of replies will have been received indicating that the Class is to be well represented on June 7, Alumni Day, at M.I.T., and also, if possible, for Tech night at the Pops on June 5. If, therefore, there is still time to make a decision to be present, please promptly advise either your Secretary here in Hartford or Willard Dow in Boston. If decision has to be made at the last moment, just look around for 1901 men after you arrive or make inquiry at registration headquarters.

In the March edition of *The Review* mention was made of Fred Clapp's important adventure in Afghanistan, and somewhat more complete information is now available as follows: He went to Afghanistan, via India, late in the spring of 1936 and during the summer was engaged in negotiations in Kabul and explorations in Northern Afghanistan as the guest of the government. Late in the summer he made a cross-country motor trip to Teheran and Bagdad; thence by

rail to Berlin, where the Afghan negotiations were continued, resulting in the signature of an oil concession during the middle of November. From there Clapp returned via Paris to Teheran, and the work of past years was finally completed successfully the following month when a large oil concession and an accompanying pipe-line concession were signed with the imperial government, being ratified by the Iranian Parliament early in February. Clapp is still in the Near East, completing preparations for comprehensive geological surveys of the two countries. His New York address remains as before, namely, 50 Church Street, and sometime later we hope to receive an additional report after further progress has been made in his geological surveys.

As a matter of fact, there is no lack of versatility among the members of the Class and as a further indication we have recently received a copy of a remarkably fine address on "Economic Trends in Manufacturing and Sales" which was made by William M. Vermilye before the Franklin Institute of the State of Pennsylvania. Any member of the Class who is interested in such matters — and there must be many who are most vitally concerned therewith — should secure a copy of this address, which has been printed, and should find it most helpful as well as interesting. As a matter of fact, the various planning boards of the National government might read it very profitably for the tax payers and might thereby be reminded further of the extreme importance of budgetary control.

Clayton Albiston has written briefly from 641 East Avenue, Pawtucket, R.I., to say that he has seen no 1901 men since our 35th reunion. We will, therefore, hope to see him in June and believe that we can promise that he shall see a number of 1901 men at that time. — Rob Montgomery, the Rose King and originator of many beautiful rose creations, has sent along a most attractive calendar which is decorated by a beautiful reproduction of several Chieftain roses, which is one of the latest and most attractive types to be developed by The Montgomery Company, Inc., at Hadley, Mass. Some time this spring or summer I hope to visit Rob, and I know that he will be glad to see any other 1901 men who are traveling in his part of Massachusetts.

Since reference was made to C. Franklin Willard in the April Review, his name has appeared rather prominently in the newspapers in connection with the strike of the employees of the Electric Boat Company at Groton, Conn., where he is judge of the local court. For a time it appeared that he would be even more in the limelight, but for his own satisfaction it ultimately developed that he could not act in his judicial capacity because of some official connection with the boat company. In any event, that situation has apparently quieted down, but if any of the members of the Class should happen to be driving through or visiting Groton and need to see a friendly judge, I am sure that Willard would be mighty glad to have them make him a visit.

*Plan to attend Alumni Day at M.I.T. on June 7*

## 1901 Continued

During the month of March, Miss Anna Billings Gallup, who is curator-in-chief of the Brooklyn Children's Museum, Brooklyn, N.Y., made a visit to Hartford to see her friend, Miss Griffin, who is director of the Hartford Children's Museum, and your Secretary had the pleasure of entertaining the two ladies at luncheon and of learning many interesting details regarding children's museums. As was noted in the February Review, Miss Gallup is hoping that a splendid new museum will be built in Brooklyn, and certainly such a project is one which should be specially favored by the PWA. If, therefore, any members of the Class have any influence with the proper New York City authorities or with those of the PWA who pass upon such projects, a real public service would be rendered by doing anything possible to secure approval of the building of the new Brooklyn Children's Museum. In any event, any members of the Class who are visiting Brooklyn should certainly give themselves a treat by visiting the present museum which is so competently presided over by our classmate, Miss Gallup.

Recently when attending the movies in West Hartford I had the good fortune of meeting Harry E. Dart and his wife. Dart is now assistant secretary of the Hartford Steam Boiler Inspection and Insurance Company, and I hope to see him again sometime soon at one of the Hartford Tech club meetings here in the city. — Charles Auer of El Paso, Texas, writes that Dean Lobdell '17 recently made a visit of two days in his city, and, at a dinner of M.I.T. Alumni which was given in his honor, there were present members of a number of the Classes from 1886 to 1933. From comments made by Auer, I judge that the dinner was a great success and that nothing was lacking which should help achieve that result.

On April 15 your Secretary attended a joint meeting at the Waterbury Country Club, Waterbury, Conn., of the Tech clubs of Hartford, New Haven, and Bridgeport. The speakers of the evening were Professor Turner '17 and Professor Thresher '20 of M.I.T., and in addition there was present an hilarious crowd of more than 70 loyal Alumni, among them J. Russell Putnam and Edward H. Davis. Putnam, who is mechanical superintendent of the Waterbury Clock Company, was not able to attend the 35th reunion because his health did not so permit. He now reports feeling much better and he hopes to attend the Alumni Day functions in June. Ed Davis, who is with the Scovill Manufacturing Company of Waterbury and who was mentioned in the January Review as being very much interested in advocating the merit system for state and Federal employees, reported that the merit system bill for the state of Connecticut, which he has been most ardently supporting, has already passed the state Senate and is now on its way to be approved by the House. Ed has done a lot of talking in favor of this bill which would appear to be a big step forward, provided it can be properly administered and not interfered with by backstage in-

fluences. Ed stated that he hoped to be present on Alumni Day in June and perhaps at Tech night at the Pops. So we may be successful in getting together a fair representation from the Class which helped to give the 20th Century such a good start and which has carried on so capably since that time. — ROGER W. WIGHT, *Secretary*, Care of The Travelers Fire Insurance Company, Hartford, Conn. WILLARD W. DOW, C.P.A., *Assistant Secretary*, 20 Beacon Street, Boston, Mass.

## 1902

While you are reading this in the June number of The Review, just bear in mind that it is written in April. Daylight-saving time has just gone into effect, which means that Patch has performed his ingenious annual stunt of arranging his watch for the summer. While most of us merely set our ticker an hour ahead and do our best to guess train times, Dan is far more subtle. Removing the crystal from his watch and turning it back side to, in reversed characters he letters numbers for the hours so that they form a ring. When the crystal is replaced they appear just inside the regular ring of Roman numerals that mark the hours. These inserted figures, however, fall one hour earlier than the regular dial so that Patch can then read his watch either for daylight-saving time or for railroad time. So skillful a job of lettering does he do that only a close inspection can detect that the second ring of figures is not part of the watch as made. When fall comes, Patch merely wipes his India-ink figures off the inside of the crystal and is back on standard time. This most ingenious scheme for meeting the exigencies of daylight-saving time and catching trains is certainly worthy of a Course XIII man.

Joe Philbrick is now a father-in-law: His son, Joseph Edward '32 was married on April 23 to Miss Winifred Goff of Old Warwick, R.I. Young Philbrick is with the Gorham Manufacturing Company of Providence. — Lester Hammond is working on the construction of the World's Fair that is to be held in New York two years hence. To be near the scene of his labors Lester is living at Flushing, Long Island, where his address is Apartment 61 B, The Mayfair, Northern Boulevard. He writes that he will be on hand for the reunion.

Which brings up the matter of the reunion and reminds us that this is the last issue of The Review in which we can look forward to that happy event. As a *Retort* is in preparation and will have reached all classmates before this Review is out, it is perhaps superfluous to go into details, but the dates are Friday through Sunday, June 11 to 13, and the place is the Oyster Harbors Club, near Osterville on Cape Cod. Unlike our 25th, this is to be a stag affair. From the interest already shown we are ready to go out on a limb and say that there will be as many classmates on hand as were at the Griswold ten years ago. While the reunion is our big event this year, don't forget that Alumni Day at the Institute is Monday, June 7, and

make that also if you can. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

## 1905

Four proud fathers — Kenway, Marcy, Loomis, and Goldthwait — each with one daughter helped to make the '05 father and daughter night held at Walker Memorial on Tuesday, April 20, a success, and Cowdrey did double service by responding with two daughters. Seven other members — Shapira, Cronkhite, Boggs, Ball, Buff, Graesser, and Strickland — attended, perhaps to envy the lucky five. One of Ralph Whitcomb's daughters, Sally, was unable to attend on account of sickness, and another, Sophomore Peggy, because of being in New York during the spring recess at M.I.T. Two pertinent questions: the first, the reason for not having a son and daughter night, was answered by Bill Ball with the further question: "What chance would we have with the young ladies, if the sons were here?"; the second, as to the whereabouts of the daughters Andy had bragged so much about, remained unanswered.

The principal entertainment was a talk by Leonard W. Cronkhite, IV, who discussed "The United States and the European Tumult." For years Cronkhite has had as a hobby the study and exploration of international affairs and his talk was listened to attentively until the time for the question box, when our other diplomats attempted to make the necessary additions and corrections. Our guests, the daughters, were all gracious enough to call the party interesting and, from that standpoint at least, the experiment of a father and daughter night was successful. Carl Graesser proposed a granddaughter night and stated emphatically that the honor of having the first two '05 granddaughters belonged to him. In line with the present vogue to rule without reference to the constitution, your Secretary grants Carl that honor and proper recognition will be accorded unless some grandfather claims and proves prior rights. Carl also had with him an application for membership to the M.I.T. Nautical Association, which contains questions, so he claims, that even Ros Davis couldn't answer. Much help was obtained on the spot from Seamen Boggs and Ball, who passed their apprenticeship on Ray Bell's schooner off Old Lyme last June.

Delayed indeed is the news just received of the death of Harold G. Crane, VI, of Adrian, Mich. The following account is from an Adrian newspaper of February 8: "The death of Harold G. Crane of 322 East Front Street, son of the late Mr. and Mrs. Eugene Crane, occurred early this morning after a brief illness with pneumonia. He was aged 59 years. Mr. Crane was born in Hudson but with the exception of about 15 years in Boston he had lived his entire life in Adrian. After graduating from Adrian High School in 1898 he attended schools in Washington, D.C., and New York City and was graduated from the M.I.T. in



## 1905 Continued

Boston in 1906. After finishing at Technology, Mr. Crane taught electrical engineering in that school and also at Harvard. For two years he was mechanical superintendent of all the Harvard buildings. In Boston he began the manufacture of machinery and in 1920 returned to Adrian where he established a factory.

"He was a member of the Phi Sigma Kappa Fraternity and in Adrian became affiliated with the Adrian City Club and the Lenawee Country Club. He is survived by his wife, Mrs. Emily Boice Crane. . . ."

Arthur P. Gerry, II, writes, giving his new address as R.F.D. Number 4, Laconia, N.H., and suggesting that he would be glad to see any classmates who may travel that way this summer. For directions he says: "We are in Gilford, not far from the new ski jump and recreational center. Just go to the village store and inquire."

— Bill Green, VI, was in Boston for a few days recently while Mrs. Green was at the Phillips House for a serious operation. We are pleased to report that her progress has been very satisfactory. — Clarence Gage, II, faithful news hawk, wrote from St. Petersburg, Fla., that he and Mrs. Gage were leaving there about the middle of May for a trip through Indiana and Wisconsin, returning to Florida after Labor Day to take up in earnest the operation of Inezda Apartments, to which they took title last fall.

Plans are definite for the assembling of '05 men at Boxwood Manor on June 4, 5 and 6, for the 32d reunion. Formal notice has been sent all men on our list, but if this is your first information on the subject, wire your application and grab the next airplane for Old Lyme, which is near New London, Conn. The main contingents from Boston and New York will arrive in time for dinner on Friday night and stragglers, at will during the day on Saturday. Plan to go from Old Lyme to Cambridge to take in Alumni Day on Monday, June 7. In case you have not received notice of a special assessment for dues, this is explanation that this assessment is informal and levied only on those who wish to help in the perpetuation of the old '05 spirit and to meet the relatively small secretarial expense.

Further honor comes to '05 in the election to the vice-presidency of the Alumni Association of Charles Reid Boggs, V, and more glory to Charlie for the honor he so justly deserves. — FRED W. GOLDTHWAIT, *Secretary*, 175 High Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 209 Washington Street, Boston, Mass.

## 1906

Our limited news-gathering service seems to be much restricted, as very few items are available for this issue of the class notes. However, the Alumni Office is responsible for one item, namely, a picture purported to be that of Max Coe extracted from the New Britain (Conn.) *Herald* of February 10. The caption under the picture reads as follows: "A vice-president of the only concern with which he ever worked, Maxwell A. Coe has been

connected with Stanley Works since his graduation from M.I.T. more than 30 years ago. He has served at the company's plants in Roxton Pond, Quebec, and Newark, N.J. Mr. Coe is a native of Omaha, Neb." We are very glad that the picture was labeled so explicitly as we would never have guessed who it was intended to be. This, of course, is the result of the usual newspaper photography which never does justice to the subject.

Every now and then items come to our attention which indicate that the members of the Class are civic minded; Ralph Patch has always been in this category. Under the date of April 9, the Stoneham (Mass.) *Independent* reported the first meeting of the school committee since town election under the leadership of its new chairman, Ralph R. Patch. This aroused sympathetic vibrations in the soul of your scribe, who is just starting his second year of a three-year term on the Arlington, Mass., school committee.

In our last issue we referred to a proposed trip of Henry Ginsburg. Only a few days ago we received a post card from said Henry, dated March 15, on the Matson liner, *Mariposa*. Henry reported as follows: "Saw Furer and Carr at Honolulu, although our stop there was cut to a few hours. Expect to see them again on return trip. Also saw Harold Coes in Los Angeles."

Classmates may have noticed that the April Review list of deaths included that of John A. Root, III, on August 29. No further details are at hand. The last few years Root had been in the Army and at the time of his death he was residing in Berkeley, Calif. Those of us who attended the 20th reunion at Old Lyme will remember how he arrived there about 9:00 P.M. on the evening of the first day, after a 300-mile drive which began at day-break at Edgewood Arsenal, Md. His enjoyment of that occasion combined with his pleasing personality added much to that reunion. — JAMES W. KIDDER, *Secretary*, Room 802, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

## 1907

From George Bryant, long among the missing as far as '07 is concerned, we received interesting news in April. Until 1914 George was advertising manager for the Franklin Automobile Company at Syracuse, N. Y.; then for seven years, president of Robel and Bryant Advertising Corporation at Chicago; from 1922 to 1927, sales counsel for Willys-Overland Automobile Company at Toledo, Ohio; from 1927 until 1932, president of Business News Bureau at New York City; and since 1932, has conducted his own business as sales and public relations counsel, with offices at Rooms 510 to 515, Home Bank Building, Toledo, Ohio. He writes that since 1932 he has averaged about 160 sales meetings a year, mostly for Ford Motor Company and now for the reorganized Willys-Overland Motors, Inc.

In connection with his work, George acts as an independent scenario writer,

and two pictures being made by Twentieth Century-Fox Film Corporation may prevent his attending our June reunion. As an avocation he writes plays and motion-picture scripts. "The Second Comin'" was produced in New York in 1931 by Jerome Wallace, "The Inside Story" by A. H. Woods in New York in 1932, and "Reason for Youth" is now being produced on the road by Guy Palmerton. "Moon Again for Breakfast" is scheduled for production in New York in October and "Eliza Jumel" in New York for December. George writes that if any '07 men are in New York when these are being produced and will call and leave their names at the box office, he will see that "two on the aisle" are forthcoming. George's first wife died in 1927 and he was married again in 1929. He has a 25-year-old daughter, Mrs. Dorothy Idella Widlund.

Bob Albro is now WPA coördinator for the city of Chicopee, Mass., in charge of the whole program there of estimating, engineering, and operation. His office is at the Chicopee City Hall, while his home address continues at 377 St. James Avenue, Springfield, Mass. — Ed Prouty, who for 29 years was active and successful in the investment business in Boston, retired in 1936 and resides in Littleton, Mass. — Harry Crohurst is senior sanitary engineer, United States Public Health Service, Treasury Department, in charge of the office of Stream Sanitation, Domestic Quarantine Division, at East Third and Kilgour Streets, Cincinnati, Ohio. He is a member of the faculty of the School of Public Health, University of Minnesota, and consultant to the National Resources Board, Washington, and also consultant to the Tennessee Valley Authority on stream pollution and industrial-waste studies. Harry's home is 6504 Park Street, Mariemont, Cincinnati, Ohio, where he lives with his wife, 17-year-old daughter, and 15-year-old son.

Roy Gale has been with the Midvale Company (steel) since 1909 and is their plant engineer, located at Philadelphia. Roy writes that his favorite recreation is in the field with a gun and a good dog, and that he also enjoys philately and baseball. He has a 15-year-old son. — Commie Gonder is president of Gonder, Kelley and Company, investment bonds, at 56 Pine Street, New York City. Since 1923 he has been engaged in financial work, following previous positions as a sugar chemist. Walter's home is at 3315 80th Street, Jackson Heights, Long Island, N.Y. He has an 18-year-old son. — Alfred Austin Brooks, II, is a thermodynamic engineer (the only one in '07, so far as we know) with Moore Steam Turbine Company, Wellsville, N.Y., where he has been located since 1926, following work in the turbine research department of General Electric Company from 1910 to 1922, and a connection with the Kerr Turbine Company at Wellsville from 1922 to 1926. Alfred has two living children, a third, born in 1927, having died in 1935.

Gilbert Small, partner of the firm of consulting engineers, J. R. Worcester and Company, 79 Milk Street, Boston,



1907 Continued

tells us that his firm designed the structural work and foundations for the new five million dollar Suffolk Court House in Boston now under construction, the Manchester, N. H., bridge over the Merrimac River at Bridge Street, the General Edwards Memorial Bridge between Lynn and Saugus, Mass., and many other bridges for the Massachusetts Highway Department and Metropolitan District Commission. Gilbert lives in the delightful suburban town of Wayland, Mass., and is particularly interested in the horticulture of flowers and small fruits. He has two sons, one class of 1938 at Dartmouth (chemistry) and one New York Military Academy, 1938. He and his wife are also caring for two orphan nieces, 14 and 15 years old.—Parker Dodge of Dodge and Sons, patent attorneys, 1341 G Street, Northwest, Washington, D. C., has seven children—four sons and three daughters—the most recent being Eleanor, born in May, 1931. The oldest son is a freshman at Johns Hopkins and the oldest girl will enter college next fall.

A letter from Marcellus Rambo, Caixa Postal 780, Rio de Janeiro, Brazil, S. A., follows: "Well, it's like getting a message from the great beyond to hear from you. I run into Denmark and Dodge when I am in the United States, as I usually drive to New York from the South, where my people live, and naturally I pass through Washington. Also I see Fales occasionally, though the last time I was home, July of 1936, he was in Mexico, and Christmas I received a post card from him from Antwerp, Belgium. He is in charge of the Gregg Company (Hackensack, N. J.) plant over there. I see Thayer every time I am in New York. He was stationed in London some time. I drove to Montreal in June, and looked up E. C. Richardson, but he was out of town."

Stuart Godfrey, lieutenant colonel, United States of America, writing on stationery bearing the crest of the 11th Engineers, at Corozal, Canal Zone, says that his detail of two years in that place, now nearly over, has been delightful. Besides commanding his fine regiment, he has, as department engineer, spent over a million dollars in fortifications and other construction adding substantially to the network of roads in the Canal Zone. Stuart's son, Charles, is now a freshman at Technology, Course VI. Godfrey will go to Washington for duty in August, in the office of chief of engineers.

To conclude these notes, we have a fine letter from Frank MacGregor from Buenos Aires, dated March 25, as follows: "Not a chance of getting to the United States to attend the 30th reunion, much as I would like to do it—I mean attend the reunion, not get to the United States, especially. Some months ago, through the courtesy of two friends, one owner of a private broadcasting short-wave station in Wilmington, Del., and one owning one here, I was able to talk with numerous friends, and later I received a letter from Dick Woodbridge,

commenting on one of the broadcasts in which I described an exploration trip to the top of the Andes. He suggested that I ought to send you some news on that and here it is.

"A few months ago with two friends I left Buenos Aires by plane for Mendoza, some 1,000 kilometers west and located at the foothills of the Andes. After getting into our digging clothes early the next morning, we left at 4:30 A.M. (you see early meant early) by automobile and drove 300 kilometers along the base of the range. At first we had a fine concrete road, then an asphalt macadam, then dirt, and then for 200 kilometers only a trail across the desert. Now and then a winding descent to the bottom of an arroyo, and a winding climb up again. At intervals we would see areas of white ash, remnants of a shower of volcanic ash carried many miles from an eruption of a volcano in Chile only a few years ago.

"Spent the night at a ranch, or *estancia* as they call them here, and early the next morning, started off in a light truck with bed rolls and duffle. Also carried a shovel and pole for emergencies, extra gasoline and water for a climb up the valley of the Rio Atuel, part of the time in low gear, ploughing through sand, and then over boulders in a dry river bed and through rushing waters on their way to join the main river in the valley. Sixty-five kilometers of this and then no more trail for wheels. We changed to mules and added some *peones* to make camp, saddle mules, cook, and so on. That night we reached an elevation of about 11,000 feet where we camped in a little valley surrounded by snow-capped peaks. Next morning after another early start—always climbing up and up—we reached a second camping place—this time on rocks only—by noon; then we pushed on as far as possible by mules and the rest of the way on foot to the crest at an elevation of 14,600 feet. The views and panoramas that unfolded behind and before us were grand, beautiful, and majestic. That night we slept in the upper camp, then the next day we returned to the lower camp and the day after to the *estancia*. In order to prevent sunburn at such altitudes we protected our faces with cocoa butter, wore colored glasses to protect the eyes, and deferred all washing and shaving for a week. At the point where we left the truck in the open, having drained the radiator to prevent freezing, there was a warm sulphur spring and it did feel good to get a swim, even if it was a case of shivers on getting out into the cold wind. Then back by truck and automobile to Mendoza and by plane to Buenos Aires.

"A few days ago I returned from a trip to Chile, this time flying to Santiago and crossing the Andes at 17,000 feet. One evening there I was invited to dinner, and who should I find as one of the guests but John Chadwick—had seen him but once since graduation and that also was accidental when I found him in a little hotel in Cananea, Mexico, in 1911 or 1912.

"Had an opportunity to renew my mining and milling experiences in the West by a visit to the Braden Copper Company mine, mill, and smelter, and then went a thousand or more kilometers south to do some fishing and see the lake district. At Pukon, tried to climb a nearby volcano, only steam and smoke coming out of the crater now, but was only able to reach the snow line. The old lava flows, over which one had to climb, indicate that it must have been a great sight when the lava was coming out hot.

"Had a day of salmon-trout fishing on the Rio Tultero, which was my first experience in fishing rapids in a rowboat. Had good luck, but found that landing three to three-and-one-half pound fish with a dry fly is a bit different from the three-quarter to one pound lake trout I have been used to in my Canada trips. Then went southeast and by a combination of auto and boats—crossing three lakes by boat, and automobiles between—returned to Argentina. These lakes are entirely surrounded by mountains, rising sheer from the water edge, some snow-capped, and many waterfalls cascading down to the lake level. The scenery that I have seen in the Italian and Swiss lake sections, I think, is surpassed by this Chilean lake region.

"Reached Bariloche, which is the end of the railroad on the Argentine side of the Andes and then had two nights and a day-and-a-half rail travel to reach Buenos Aires. Distances may be long in the United States, but so are they in Argentina." — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

We have the following changes of address to report: Robert W. French, 522 Semiole Drive, Erie, Pa.; Philip J. Hale, 18519 Kinsman Road, Cleveland, Ohio; John J. Mullen, 3048 North Speer Boulevard, Denver, Colo.; Stanley F. Nelson, Room 1001, 463 West Street, New York, N. Y. — H. LESTON CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

## 1909

A motion picture, "The Evolution of a Navigator," by Risdale Ellis was one of the eight pictures chosen from 30 entries to be shown at the annual amateur film exhibition given at the Salle des Artistes in New York City on April 2. — Lieutenant Colonel Kenneth T. Blood is now located at the Schofield Barracks of the United States Army at Honolulu, Hawaii. — Harry Webb of Memphis, Tenn., reports that with the advent of the NRA he closed up his old business in grain and supplies, after 21 years of operation, and since then he has been very busy adjusting himself to New Deal programs and establishing himself in a new business. He organized the Technical Service Associates, consulting specialists on all sorts of matters. The result is that he has met quite a variety of engineering problems and made some very satisfactory

1909 Continued

connections. At the present time his organization is in charge of three mines in Mississippi dealing with clays and secondary bentonites. He also looks after the plants and production control, covering prospecting, mining, and special machine design, and directs most of the research work. It is rather a striking situation that Webb, after studying mining at M.I.T. and then going into the grain business in Memphis for 21 years, is now back in mining operations.

The New York *Herald-Tribune* of April 17 reports that State Senator Thomas C. Desmond introduced a resolution in the New York Senate calling upon Congress to abolish existing regulations exempting governmental employees from the income tax, to repeal the capital gains and the lesser sections of the income-tax law, and to lower the present income-tax exemption figure. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

## 1910

It is with great sorrow that your Secretary reports the death of our classmate, Russell D. Wells, who passed away on April 7. The following notice appeared in the daily *Local News* of West Chester, Pa.: "Russell D. Wells, manufacturer and church leader, of Pottstown died yesterday afternoon in Temple University Hospital, Philadelphia, following complications which developed from a fractured vertebra. His death came as a complete surprise to friends and relatives, as his condition had not been thought critical. He was in the 51st year of his age. Mr. Wells was born in Spring City, a son of I. I. Wells and the late Mary Diemer Wells. He was graduated from the Hill School in Pottstown and the M.I.T. with mechanical and electrical engineering degrees. During the World War he served in the ordnance department. Mr. Wells headed a number of organizations. He was president of the Floyd Wells Company, Royersford; president of the Manufacturers' Protective and Development Association; trustee of the Institute of Cooking and Heating Appliance Manufacturers; director of the Citizens National Bank and Trust Company of Pottstown; past president of the Rotary Club; one of the founders of the Pottstown College Club; a director of the Pottstown Library Association; a member of the Chamber of Commerce; and was engaged in many civic affairs of the borough. He was elder and an active member of First Presbyterian Church, Pottstown. Mr. Wells is survived by his wife, Clarice Anderson Wells; his father, who resided with him; a son, David A. Wells, student at Wesleyan College; two daughters, Mary and Barbara, at home; and a brother, Roy Wells, Frick's Locks."

Further details regarding his death could not be obtained. Your Secretary saw Rus last October, and he felt that he had arrived at a point where things were coming along so that he would feel comfortable for the rest of his life. He was

considering taking a European trip for the International Rotary this spring. — I am glad to report that Karl D. Fernstrom has been advanced to a full professorship in Course XV at the Institute.

From the Boston *Herald* we note that Bill Keefe is engaged in other things besides engineering. Under a heading which read "Engineer Keefe Shows Huge Egg," the clipping went on to say: "'We do things in a big way down there,' remarked Chief Engineer William J. Keefe of the state public utilities department today, as he proudly displayed to colleagues a giant hen's egg, three-and-three-eighths inches long, laid by one of the hens on his Hingham farm." — Berg Reynolds of Rochester, N.Y., paid your Secretary a visit during the week of April 19, while he was taking a vacation from his duties in the maintenance department of the Eastman Kodak Company. — HERBERT S. CLEVERDON, *Secretary*, 46 Cornhill, Boston, Mass.

## 1911

Greetings, Professor Alfred Victor deForest, and congratulations from your classmates on your promotion from associate professor to professor in the M.I.T. Department of Mechanical Engineering! A. V. has risen rapidly during his two years on the staff and now takes rank along with Gordon Wilkes, II, who is professor of heat engineering in the same department. In addition to the extensive research which DeForest has been and is carrying on in an ultra-modern testing materials laboratory of his own design, he gives a graduate course in dynamic structure of metals. This is described in the Institute catalogue as "a laboratory subject, with weekly seminar, devoted to the study and experimental investigation of the strength and life of metals under working conditions."

In the spring a young man's fancy. . . . Well, we learn from a newspaper clipping that John Taylor Arms, IV, etcher and lecturer, has been talking to Westchester County garden clubs on "Design in Flower Arrangement." — From the Alumni Office we again have track of Merton W. Hopkins, I, about whom we have been in the dark for years. He is at 11 East 44th Street, New York City. From the same source we learn that Cap Maguire, I, has left New York City and is once again in his home city of Providence, R.I., at 310 Elmgrove Avenue.

Never has attention been focused any more diligently on Washington than in the past few years. It therefore seems opportune to chronicle the details concerning 15 members of the Class now located there: In a civilian capacity Dave Allen, II, is with the Washington Gas Light Company, and David Saint Pierre (Pete to you) Gaillard, VI, is in the investment banking business at 839 17th Street, Northwest. In government bureaus we have Roger Boyden, I, chief of the section of loans, Interstate Commerce Commission; R. W. Cushing, VI, senior engineer with the Federal Power

Commission; John Firmin, IV, with the Patent Office; Henry Hoysradt, VI, an assistant engineer with the Public Utilities Commission; Phil Kerr, II, chief of the review section of the PWA; Howard Knowles, V, and Maurice Thompson, XIV, with the Bureau of Standards; Charles Magoon, VII, senior bacteriologist with the Department of Agriculture; and Clarence Ofenstein, I, a civilian aeronautical construction engineer with the Air Corps. In the military service we have Captain George Kenney, II, Air Corps; Major Sidney Spalding, III, Ordnance Department; Major Laurence Watts, I, Signal Corps; and Major Lawrence Weeks, VI, attached to the War Department.

These notes will appear about a week before the 1937 Alumni Day at Tech and I want to urge each and every one of you who can possibly do so to obey that urge to spend Monday, June 7, at the Institute. I'll be seein' yer! — ORVILLE B. DENISON, *Secretary*, Hotel Bancroft, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

## 1912

When the M.I.T. Club of Northern New Jersey meets to welcome Dr. Compton, our Class always manages to have a few representatives among those present. At the meeting on April 7, held in Newark, L. A. Matthews, VII, F. J. Osborne, VII, Harold H. Brackett, VI, and your Assistant Secretary enjoyed a miniature class reunion, as well as the excellent dinner and speeches.

E. C. Holbrook, I, lunched with your Assistant Secretary recently in New York, and reported that he will be returning to Manila at the end of April. But this time he is going out to a new job. He is going to be in charge of the Manila office of the United States Steel Products Corporation, a subsidiary of United States Steel. — Bob Wiseman, VI, is again on the Pacific Coast at this writing, but hopes to return in time for our big 25-year reunion this month. — Martin C. Cherry, II, has recently been appointed general agent of the New Hampshire Fire Insurance Company for Boston and the metropolitan district. He will also continue the supervision of his present territory in southeastern Massachusetts and Rhode Island. — A tea, attended by some 25 members of the Class, with their wives, was held at your Secretary's home on April 11. Plans for the reunion were discussed and everyone there promised to write out-of-town friends, urging them to come East. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42d Street, New York, N.Y.

## 1913

I was very glad to get a letter from Paul E. Rudolph, I, although it contained sad news. Rudolph writes that Marshall Loeb, II, of Meridian, Miss., died recently at his home from pneu-

*Plan to attend Alumni Day at M.I.T. on June 7*



## 1913 Continued

monia. He leaves a widow and two boys. Loeb was a public-spirited chap and he gave much of his time to civic affairs in his native Meridian. Rudolph is in the real estate business in Chicago, and promises to write me again, concerning his own career. I hope he will not forget it.

From the Boston *Evening Transcript* of March 6, I learn that we went to school with an honest-to-goodness playwright: "Yes, My Darling Daughter," according to the *Transcript*, is a delightfully written comedy playing in New York this season. It was written by Mark W. Reed, IV, who took his degree with us. Reed's story has an Horatio Alger flavor to it. After leaving the Institute he attended Professor Baker's class at Harvard and later he went to War, serving with Homer Saint-Gauden's camouflage division. Just as soon as he returned to this country he got a play on Broadway, which did not make the grade. After writing several more plays, he devoted himself for a period of six years to writing fiction, to school teaching, and to factory work. All the time, however, he was plugging at his chosen job of playwrighting. Broadway heard from him again in 1935 when he put "Petticoat Fever" over with considerable success. The *Transcript* writes in very complimentary terms of his latest play and it is pretty certain that we shall hear more from him. This is certainly an interesting career for a Tech man.

From the Alumni Office I learn of the death of Ross D. Sampson, III, in Evans-ton, Ill. I knew Ross quite well and he was a delightful fellow. We were in Buffalo together for a period shortly after we left the Institute and I saw quite a little of him. He was the kind of chap to whom you are drawn and I am very sorry indeed to hear of his passing. — Winfred S. Boynton, II, has moved from Detroit to Elizabeth, N. J. — George W. Forrester, X, has left Clinton, Mass., to take up his residence in Lynn. — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 784, Pawtucket, R. I.

## 1914

Last call for Alumni Day! Because the center of gravity of the Class has dropped down to New York, our annual dinner has for the last few years been held there, but those around Boston have gotten together in connection with some general Technology meeting. To permit the Classes to get together on Alumni Day the evening program has been changed entirely to one of entertainment at a hotel. This will permit us to have a room for class headquarters, where we will meet between five and seven P.M. This will be at the Hotel Statler, Boston, so make your plans to be at Alumni Day, Monday, June 7, and join with other '14 men at our preprandial celebration.

On April 6, at the Midston House, New York City — home of the Technology Club of New York — Charlie Fiske put on one of his always-to-be-remembered dinners. After a most enthusi-

astic predinner session and a delightful meal, Herman Affel ran his projector and showed the Edgerton high-speed movies. Although the 25th reunion was briefly referred to, there were no formal speeches. Several men came in from the hinterland to attend this dinner. They included George Whitwell of Philadelphia, recently elected a term member of the M.I.T. Corporation; Art Peaslee from Hartford; Clarke Atwood and your Secretary from Boston; and Louis Wilson of Palmerton, Pa., whose son, a freshman at Technology, is making a name for himself at basketball.

When thinking of a New York dinner we often lose sight of the fact that some of the "locals" actually come in from quite a distance. Thus, after the dinner Chet Ober had to find his way back to Glenbrook, Conn., probably mutually assisting Charlie Fox to Darien. Ross Barratt had to go up the river to Ossining, and Walter Hauser up the Sound to Larchmont. Known New Jersey travelers included Alden Crankshaw of Chester, recently appointed Honorary Technology Secretary for the Morristown district; Affel from Ridgewood, Ross Dickson from Elizabeth, L. D. Faunce from Newark, Dave Gould from Riverton, O. C. Hall from Radburn, and Jack Hines from West Orange. Long Islanders, such as Charlie Fiske and George Perley, consider themselves as just east of Fifth Avenue. Commander Tom Richey from the Brooklyn Navy Yard was with us as usual, with his ever genial smile. Paul Owen had to share his honors as the only resident of Manhattan present with Peb Stone, who has moved in from Bridgeport, Conn. Other loyal '14 men journeying into the big city for the dinner included Homer Calver, Tom Duffield, Bill Simpson, and Seymour Spitz, whose suburban addresses are unknown to your Secretary. We missed Bob Townsend, who occasionally gets in. Bob has recently been appointed Technology Honorary Secretary for Kearny, N. J. Gus Miller also was missing, but only because he has recently gone to Washington with the Bendix Radio Corporation.

The Class is collecting quite a group of honorary secretaryships. In addition to the two already mentioned, we have Leigh Hall at Concord, N. H., Ray Dinsmore at Akron, Ohio, and Werner Schaurte at Neuss, Rhineland, Germany. — It is with exceeding regret that there is here recorded the death, on March 30, at Stoneham, Mass., of Walter P. Houston after an illness lasting nearly all of the past winter. Walter leaves a wife and two sons, but, as he was one of the few who were married before entering Technology, both sons are now of age.

Last month in commenting on Porter Adams it was noted that he was in Boston for the winter on leave of absence from the presidency of Norwich University and also that his mother had been confined to a Boston hospital all winter with a broken hip. Since those notes were written Mrs. Adams died quite suddenly, and Porter, to improve his own health further, went to the West Indies.

Our versatile chemist, E. C. Crocker, is still talking about his smells. This time it is a paper before the American Chemical Society, at Chapel Hill, N. C., on association of smell and taste. In part, Crocker said: "Professional chefs, tea tasters, and coffee tasters were found to be people of normal taste sensitivity who have developed keen discrimination through intensive training and the cultivation of exceptionally dependable observation. Few among them, however, have enough of the picture of the fundamentally chemical substances with which they are dealing to meet the demands of present-day highly developed industries. The need is being felt for educated tasters. These tasters would be scientifically trained, not only to perform the work itself with skill, but also to interpret their findings in a language intelligible to others."

Another active member of our Class is Norman MacLeod. Only recently president of the Machine Tool Trade Association, we now find him as president of the Associated Industries of Rhode Island. This, of course, is all in addition to being president of the Abrasive Machine Tool Company, to say nothing about the active part he takes in many civic affairs around Providence. On April 23 Norm was one of the speakers at the University Club, in Boston, at the New England College and Industrial Conference. — H. B. RICHMOND, *Secretary*, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N. Y.

## 1915

By now you all have the first letter outlining our plan for the fund for our 25th reunion. First, you no doubt will be interested to know the class statistics: There were 318 graduates, 232 non-graduates, and up to date, 49 deceased. Of the 550 men associated with the Class, we have a mailing list of 475; the balance are without known addresses. Of these 475, 27 are in 11 foreign countries including Canada. The others are scattered over 38 states and the District of Columbia. The only states where no classmate lives are Wyoming, North Dakota, South Dakota, Nebraska, Vermont, Idaho, Arkansas, Missouri, Kansas, and South Carolina.

The returns from the first mailing include eight \$25 checks, and three \$10 checks — a total of \$230. This is a hard job, fellows, and remember I am not doing it for myself. It is for the Class and for all of you. It is no easy matter, and I cannot do it alone. The committee is very cooperative and earnest, and we want not only your help and support but we need your help and support to make this 25th reunion a success. In fact, more than that, let's make it the best 25th reunion any Technology Class has ever had.

I have a number of interesting letters from the territorial committeemen which will be material for our next notes. This month I simply want to tell you seriously and straightforwardly about this 25th reunion \$5,000 fund and urge you all to



1915 Continued

send Frank Scully your checks — whatever you can afford. It means loyalty to 1915. — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

## 1916

Al Lieber, now a major in the Corps of Engineers, United States Army, writes from Zanesville, Ohio, telling about his work. He has been stationed in the Zanesville United States Engineer district since July, 1934, as assistant to the district engineer, Lieutenant Colonel J. D. Arthur, Jr., '23. His work is in connection with the flood control and conservation program of the Muskingum River in central and eastern Ohio. This work involves the building of 14 dams, 10 railroad relocations, four gas line relocations, and so on, all being done by the Corps of Engineers of the Army under a Federal grant of \$27,000,000. Al writes: "My work for the past few years has ranged from dam construction to debating the esthetic qualities of a levee around the historic village of Zoar, of which you have, no doubt, never heard. A great many of our classmates would be particularly interested in Zoar, as I was when I learned that the early Zoarites used to make the best beer west of the Atlantic coast line.

"I have recently received orders relieving me from my assignment here and assigning me as a student at the Command and General Staff School at Fort Leavenworth, Kansas, next August. I shall hate to leave my assignment here, but I am looking forward to the opportunity to attend the school, which has been one of my ambitions for several years. My six-year-old boy and I shall be starting school together, not in the same classes at first, however. I shall enter my schoolboy status with recurrent misgivings about handwriting, harking back to the time that Jimmy McDougall and I worked a joint note-keeping system in one of Molly Pearson's classes. Jim listened to the lectures and made comments to me, and I kept the notes. At the end of the year neither of us could read the notes, so we took them to Professor Pearson and explained that we understood that if we had a C grade we would be excused from the final examination. The good Professor came through with a pair of C's and we were never obliged to decipher the handwriting."

Al writes of seeing Ralph Millis and Charley Reed occasionally. I hope we shall have some news of them to report soon. He also speaks of Jap Carr. Just what he means by calling him a fruitcake maker I do not know, but have started investigations.

When in Boston last week I talked with Henry Shepard, who has been very busy recently, moving his office. He tells me that the sale of bowling balls is continuing to increase by leaps and bounds, and that his chief worry at present is to get enough stock made up to take care of the expected rush next fall. He derived considerable satisfaction from making a par four on a 392-yard hole on his first golf game this spring. To me that sounds like

a record that probably most of the classmates can duplicate. Shep also tells me that he had a visit with Ed Barry, riding up on the Boston train from New York. Ed, you know, is now sales manager of the Riley Stoker Corporation of Worcester, Mass. Ed seems to be very happy to be back in New England again. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

## 1917

The peripatetic investigator for the Class returned from the West with enthusiastic reports of a number of men coming to the reunion from a distance. He returned in time to receive Ham Wood's many-in-one announcement and asked for a bit of explanation that perhaps may be desired by others. It seems that Ham Wood is duly qualified for appearance as an expert on the subject of gout. In the course of his preparations for the reunion, he sampled beverages and comestibles rather too generously. The result was a painful affliction, traditionally the basis for humorous remarks by all except the victim. He is now recovering from the gout.

Jack Wood is well under way with his sailing demonstrations, actively serving as sailing master, and recently was in charge of an intercollegiate dinghy race on the Charles. Officiating in all his glory, Jack had the pleasure of seeing M.I.T. make an unusually good showing.

At the last minute, Ham reports the burning of the Boylston, the building next to Corinthian, in which 1917 reunionists have been housed in times past. He gives assurance, however, that the Corinthian itself is to be exclusively 1917 from 4 P.M. on Friday, June 4, to 9 A.M. on Monday, June 7. Ample accommodations will be available there or in the very near vicinity.

John C. Platt, Jr., of Fort Sam Houston, San Antonio, Texas, sends along his regrets. His presence in June would disrupt the entire communications system of the San Antonio Corps Area where large-scale maneuvers are planned for that time. Skipper Works (Nelson C. Works, III), he of the Paine Webber organization in Chicago, will be in Marblehead in all his glory. He is in a position to boast a bit, if he insists, for he has a son old enough and keen enough (sons resemble their mothers) to do brilliant work at Yale and with Tech in prospect.

Frank Crane, writing through capable proxy, tells us of the wedding of Carl John Malmfeldt, now of 1578 Boulevard, West Hartford, Conn. His big event took place at Seaport, Conn., on February 5, with Miss Edith Margaret Parse the happy bride. Mrs. Malmfeldt is a graduate of the Horace Mann School in New York and the Boston School of Physical Education. Carl studied at the graduate school of architecture at Harvard after leaving the Institute. — The informant, Frank Crane, is still with the Bureau of Engineers, Los Angeles.

On April 7 the New Orleans *Times-Picayune* carried a beautiful photograph of Albert F. Hegenberger. In command of the 30th bombardment squadron, Heggie had flown into New Orleans that morning at the end of a 3,700-mile trip. Well timed, the squadrons landed in New Orleans for Army Day, and the city was theirs. The trip had been arranged in order to initiate the fliers into blind flying by flights' squadrons.

The Secretary telephoned the chairman of the reunion committee for last-minute news and could receive only assurance that all was going well and that nothing further need be said. Our readers may be reminded, however, of the prospect of eternal regret if, for any reason, they are compelled to miss this grand affair. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

## 1918

Sometimes the telephone rings with a sound that is full of half-spoken promises; sometimes as though it were about to squeeze out a little laughter. Perhaps there were both elements present when Stan Cummings called us on April 2. He had come East with that persevering insistence which says that in looking for a good man to hire for a research lab, M.I.T. is the place to go dipping for prospects. Asked what bright and precious items he had to offer for these columns, he said he wanted us to say nothing; that he was not looking for glory but was still looking for what he lost in 1929.

H. C. Levine showed up one day, resplendent with the business card of the Atmospheric Control Company, H. C. Levine, President. He is located in Detroit — that mecca which caused leap year to be followed by sit-down year. With the eastern Michigan territory under his wings, a son, eleven, and a daughter, eight, under his feet, he represents the Carrier Engineering Corporation in the installation of air-conditioning machinery for theaters, fur-storage warehouses, department stores, and what have you.

Art Windle writes with rigid economy of emotional expenditure that he has a new job as plant engineer of the Jersey City factory of Colgate-Palmolive Peet Company. Mrs. Windle and Art just packed their satchels and moved from Cleveland, as simply as that, and from all reports are particularly glad to be back East again (as though Cleveland were West to anyone who had really been West!). Art is cliff dwelling at 28 Duncan Avenue, Jersey City, N. J. In the attempt to make us think him a bewildered and myopic alumnus he says he is now well over 40, partly bald, and almost pretty proud of one wife, one radio, and one car — all unencumbered by first or second mortgages.

I see by the papers that Yale won the intercollegiate human engineering contest from Technology this year, Professor Smith's team doing a better job at handling an intense human situation than Professor Magoun's team. This makes the score one victory apiece to date, not

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counting the intangible value to college boys who learned that solving a problem involving people is not just getting a statement of facts but a process — and the process may look easy but it is not simple. — F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M.I.T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

## 1919

Well, fellers, those of the Class around Boston had their second get-together within six months, and once again had a turnout of over 20. Anyone who says this Class is disorganized and dead is crazy, in the opinion of yours truly. Just to make sure that you are not one of the dead ones yourself, plan to turn out for the next get-together in the fall. Ten new faces appeared this time and many others expressed regrets that business interfered on that particular evening. We should have a good representation of the Class at the Alumni Day banquet at the Hotel Statler on Monday, June 7, during alumni week-end. After we get organized we should be sure of a turnout of 30 or 40 men at any of our Class meetings.

After dinner at the University Club in Boston each man present told briefly about himself and family, and then we went downstairs for bowling. The following men were present: Henry Bruno, who handles sales for his own wood-working company; Alan Richards, who is assistant to the president of Dewey and Almy Chemical Company, Cambridge; Bob Hackett, in the wool business with Nichols and Company, Boston; Clarence Nutting, chemist of the Arlington Mills, Lawrence, Mass.; Gene Mirabelli, Assistant Professor at M.I.T.; Art Blake, sales representative in New England of Blakeslee and Company, Illinois manufacturers of automatic degreasing machines; D. K. Webster, who is with his dad, manufacturing grain and feed for poultry, and so on; Leon Snow, in the clothing business; Hyman Selya, who recently formed his own company for handling dyestuffs; Stuart Hayes, fiber expert with Ludlow Manufacturing Associates, Boston, manufacturers of jute twines; Maurice Role, electrical contractor; Roy Burbank, industrial fire protection; Scott Keith, specification writer for Metcalf and Eddy, consulting civil engineers; Harold Moberg, engineer with E. B. Badger and Sons Company, Boston, manufacturers of stills for oil refineries; Jim Holt, Associate Professor of Mechanical Engineering at M.I.T.; Rod Blood, New England sales manager of the Standard Conveyor Company; Bill Bennett, Jr., still operating his wholesale plumbing and heating supply company; George Michelson, who is with J. Slotnik Company engaged in general construction and contracting in Boston; Art Griffin, who has his own company doing general contracting; Arklay S. Richards, who is sales representative in eastern Massachusetts for the Brown Instrument division of Minneapolis-Honeywell Regulator Company; and Leo Beaulieu, who has an

electrical contracting business of his own in Holyoke, whence he drove a distance of approximately 100 miles to attend the meeting.

A pretty good turnout, I call it, and every one thoroughly enjoyed himself. Next time we are going to have some one from the Institute talk to us on something of common interest. — Received a questionnaire from George R. Bond, Jr., X, who is research chemist for the Catalytic Development Company, Philadelphia, Pa., and lives in Paulsboro, N. J. He has three children: Thomas, nine; Albert, seven; Phyllis, five. George says he has been located in south Jersey for the past 18 years, of which 11 were with E. I. du Pont de Nemours and Company and the other seven with the Vacuum Oil and the present company. George has apparently weathered the depression and is enjoying his work; he rarely sees any of the Class.

I also heard from J. Harold Kaiser, X, who is with the Solvay Sales Corporation in Syracuse, N. Y. He has three children: Shirley, eleven; Howard, six; Mary, one. — Howard McClintic, Jr., I, writes that he is vice-president of the Pittsburgh Piping and Equipment Company, Pittsburgh, Pa. He is married and is anxious to get the bunch around Pittsburgh organized. Any of you fellows in that vicinity, get in touch with him. Howard worked in the structural steel business for 12 years, and his company was then absorbed by Bethlehem Steel for whom he sold for three years. He has been with his present connection for two years and greatly regrets neglecting his thermodynamics and steam engineering at the Institute. Howard occasionally sees Norwood Johnston, who is drilling gas wells in New York State, West Virginia, and Ohio. In closing he adds a few encouraging remarks regarding the reactivating of the Class. A nice letter, Howard, and we will let you know when we hear of members of the Class in the vicinity of Pittsburgh. — ARKLAY S. RICHARDS, *Secretary*, 26 Parker Street, Newton Centre, Mass.

## 1921

June, the month of roses and reunions, recalls our Famous Fifteenth last year at Norwich, Conn. Alumni Day at Cambridge on June 7 will afford us another opportunity for renewing old friendships and enjoying a splendid program of events in both serious and lighter vein.

We quote from the *Standard Insurance Weekly* of Boston: "The Fire Association group announces the appointment of Harold M. Estabrook as a special agent in the Massachusetts territory. Mr. Estabrook is exceptionally well equipped for his new duties. Born in Arlington, Mass., he received his education in the local schools, at Chauncy Hall, and at Technology where he studied mechanical engineering. His business experience has been with the Boston general agency of Patterson, Wyld and Windeler, with which organization he became associated upon completing his schooling. His first duties were in the engineering and the automobile fire and theft departments. For the past 11 years he has served as special

agent in both fire and casualty lines. Mr. Estabrook is chairman of the board of selectmen in Arlington and also a director of the Arlington Coöperative Bank. His many friends in the Patterson, Wyld and Windeler office tendered him a testimonial dinner and presented him with a suitable memento of the occasion."

Max Burckett, Chink Chatham, Cac Clarke, Bill Emery, Sumner Hayward, Fred Kowarsky, and Ralph Westen were among the regular class delegation attending the annual banquet of the M.I.T. Club of Northern New Jersey at the Newark Athletic Club on April 7. Bill Emery, Munnies Hawes, Art Turner, and Cac Clarke have been named among the Honorary Secretaries of M.I.T. for the New Jersey Club's district.

Recent changes in addresses include: Jerome J. Collins, 42 Lee Avenue, Scarsdale, N. Y.; Robert M. Felsenthal, 440 Oakdale Avenue, Glencoe, Ill.; Robert B. Frost, 515 Union Street, Hudson, N. Y.; Joseph G. Kaufman, 32 Ripley Road, Dorchester, Mass.; Alexander J. La Pointe, Acme White Lead and Color Works, 8250 St. Aubin Avenue, Detroit, Mich.; Feng C. Ling, 4 Fieshan Road, Tsingtao, Shantung, China; G. Frank Lord, 143 Taconic Avenue, Great Barrington, Mass.; Winthrop E. Luke, 69 Woodmont Street, West Springfield, Mass.; Robert F. Miller, 13605 Chautauqua Avenue, Cleveland, Ohio; Professor Harold K. Moritz, College of Engineering, University of Washington, Seattle, Wash.; Donald W. Randolph, 2921 Westwood Parkway, Flint, Mich.; Herman L. Schmidt, 1192 Park Avenue, New York, N. Y.; Hugh D. Seaver, Cranbrook School, Bloomfield Hills, Mich.

Here's to seeing you next Monday in Cambridge. And, of course, don't forget to drop a line to your Secretaries. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N. J.

## 1922

Inasmuch as a reunion is an event which occurs only once in every five years, your correspondent has decided to devote this issue of the class notes entirely to this subject, so that it may receive your full and undivided attention. We give you herewith communication just received from Heinie Horn: "Final arrangements have been completed for the 15th reunion (how old we get) to be held at the Sheldon House, Pine Orchard, Conn., June 3 to June 6. This is a few miles east of New Haven, on Long Island Sound. The usual program, as in the past, will be followed generally, with the customers checking in starting Thursday evening, June 3, at which time the general assembly room will be formally opened and a buffet supper served for those who wish it. Room assignments will be made in advance so that one old roomy can join another or more.

"Friday will see the start of the golf and tennis matches, with the Honorable Rotund Rosy Ray Rundlett handling the



1922 Continued

golf, and the also Honorable Clate Grover taking care of the tennis. Friday night, following dinner, the movies from Class Day through and including the last two reunions will be shown, while Messrs. Hodgins, Horn, and Sallaway will prepare for the traditional treasure hunt. The doubloons and pieces of eight will amount to 25 cold dollars or enough to pay nigh the price of the reunion for one man. Saturday will wind up the tournaments, and, in the afternoon, wind and limbs permitting, the usual field day by Messrs. Sallaway and Sherbrooke will be held. The surviving members of Course XV will again try to keep their record clear against Course II in the ball game. For those not playing golf, Dyno Spaulding will again run his fishing trip, and at the banquet that evening we will hear, but not see, about their trying times at sea and the large blackfish landed, for this is a section in which they run. Sunday will see the windup of the rejuvenation reunion, with the final meal at noon.

"Transportation from New York or Boston may be arranged by getting in touch with H. J. Horn, Jr., 1056 Broad Street, Newark, N. J., who is familiar with the facilities of others driving to the reunion. The cost will be the same as heretofore — \$29.95 for the full time and proportionately less thereafter. As in the past, this will include everything the hotel has to offer, as well as such meetings as one wishes to hold in the general assembly room."

The only thing that we can think to add to the above communication is the opportunity for a swim in the salt waters. Pine Orchard is on Long Island Sound and has a good beach which will appeal to all you landlocked gentlemen formerly used to the salty, wide open spaces. Grasp this opportunity! It will be June, 1942, before you have another like it! Pine Orchard, Conn., June 3 to 6. — C. KING CROFTON, Secretary, United Eastern Coal Sales Corporation, 1332 Lincoln-Alliance Bank Building, Rochester, N. Y.

## 1923

G. W. Hall, Jr., has recently been convalescing from an appendix operation and reports a new job and title as statistician, attached to the president's office, Loose-Wiles Biscuit Company, Kansas City, Mo. He says he's been on sales research since 1932, but his current duties involve branching out into manufacturing and management. — Another job report comes from D. H. McNeal, deputy to the general manager, Home Owners' Loan Corporation. He says: "For the past ten years I have been engaged in some phase of housing development, principally from the financing standpoint. About seven years ago I organized the National Homes Finance Corporation which was a home financing company owned and controlled by manufacturers and retailers of building materials. About three years ago the Federal Home Loan Bank Board, who are directing the activities of the Home Owners' Loan Corporation, asked me to come to Washington to take charge of the rehabilitation program

of the Home Owners' Loan Corporation, which Congress had approved at that time and for which the fund of four hundred million dollars had been established. This department has executed over four hundred thousand of these repair contracts. About a year-and-a-half ago I was placed on the general manager's staff to take charge of all of the technical activities of the Home Owners' Loan Corporation and other agencies of the Federal Home Loan Bank Board. This includes the following types of work: reconditioning, appraisal, Federal home-building plan, building-cost index, new Home Owners' Loan Corporation building, allocation of office space, building permit survey, expositions and other exhibits."

Dr. and Mrs. Joseph Linn Hetzel of Waterbury, Conn., announce the birth of a daughter, Anne Dickerman, on April 7. Mrs. Hetzel is the former Miss Margaret de Lancey, daughter of two Technology graduates, Darragh de Lancey '90 and Harriet Gallup de Lancey '94.

When, in 1923, the Institute Committee cracked down on *The Tech's* ambitions to become a newspaper, I gave up hope that it might become much more than a sheet to print notices handed out by the activity moguls. Unless *The Review's* clipping service has been letting me down, there hasn't been an item I could lift from its columns about '23 men since graduation, now 14 years gone. I should say that there hasn't been — until now. Here's an item from *The Tech* about Weaver W. Adams. Adams, member of the Technology Chess Team from 1919 to 1923, was New England chess champion in 1924, Massachusetts champion in 1929, Boston City Club champion in 1935, and top board in the Metropolitan Chess League from 1919 to 1936. In the latter capacity he is reported not to have lost a game during the period. He is also author of a booklet on chess, "White to Play and Win." What brought him into *The Tech's* limelight was his playing white at Walker Memorial one Saturday in March, on some 30 boards simultaneously. He won all games but one.

The Boston crowd had another luncheon on April 5 at the Boston Chamber of Commerce. Present were: Russell, Marder, Allis, Averell, Mann, Fitzgerald, Clapp, Walton, Chatto, Johnson, Golding, and Bond. The next gathering will be at the Great Court luncheon on Alumni Day, Monday, June 7. No reunion is scheduled for this year, but there'll probably be a 15th next year. — HORATIO L. BOND, Secretary, 195 Elm Street, Braintree, Mass. JAMES A. PENNYPACKER, Assistant Secretary, 96 Monroe Road, Quincy, Mass.

## 1926

There will be a meeting of the Class on Alumni Day, June 7, at 4:30 P.M. at the Hotel Statler, Boston. The meeting will be posted on the bulletin board so there will be no difficulty in finding the room. The tea will be quite informal and will last until the opening of the big Alumni Dinner in the main ballroom of the Statler. Members from far and wide are ex-

pected, and it is hoped that we will not only have a large delegation on deck at 4:30 but an equally large one present at the dinner following. During Alumni Day at the Institute, the Secretary, as he emphasized last month, will welcome any of the footsore and heavy laden in his office, Room 11-203, *The Technology Review*.

From down where life is still reasonably simple, decently paced, and telephone numbers are in two digits, comes the following letter. It is signed Whitney Ashbridge, captain, engineer-reserve, commanding the headquarters of subdistrict No. 19, CCC. His letter: "I note in your April class notes that you plan a dinner in June. A good idea, but why not have a series of dinners all over the country (and not \$100 a plate ones either)? What I'm driving at is this: I can't get to Boston and you probably can't get down here to southwest Virginia. *Ergo*, if there are groups of 1926 men fairly close together, could not they get together to celebrate the 11th year away from the Institute at places reasonably convenient? I spend over half my time on inspection trips, visiting my ten camps out here in the farthest corner of the Third Corps Area, but I could manage to get to Bluefield, Bristol, Roanoke, or some such place if there were others living near by.

"As I've been in this CCC business nearly four years, I'm getting to be pretty much of a backwoodsman and expect to find things changed in many ways when I go back to civil life (and that will probably be fairly soon, as active duty for reserve officers is now limited to four years except for subdistrict commanders, who can look forward to April 1, 1938, as the outside limiting date)." — Others wishing to follow through on Whitney's suggestion will have the full coöperation of the Secretariat, even to the extent of supplying lists of men in the given regions.

News of the month includes a new Sc.D., a new milling operation, one engagement, and one birth. The Sc.D. was obtained by Manfred Rauscher, who is assistant professor in the Course in Aeronautical Engineering at the Institute. Out in that city with the poetic name — Telluride, Colo. — C. E. Tonry has been developing a milling operation on a deposit of complex ore, which he plans to finance and operate himself. The engagement of Francis E. Walsh to Miss Frances Connor of Somerville, Mass., was announced in April. Walsh is with Standard Oil in New Jersey. Is there any one in the Class who can match Eben Haskell's three little maids? The third of these was born on April 14 while Eben was busying himself with such mundane things as the letter on our Class Endowment Fund which contributors to this Fund should have received by the time they read this.

At the reunion last June the Endowment Fund committee was all primed to make a report on some of the changes that had been effected in our endowment plan. But as the reunion went, any public report would have been like the proverbial whistle in a gale of wind, if you

*Plan to attend Alumni Day at M.I.T. on June 7*



will pardon the polite euphemism. What the committee wanted to say was this (which is taken from the letter recently mailed to contributors): "Your committee has given very careful study to the ways and means of arriving at the largest capital sum to be turned over to the Institute on our 25th reunion. As a result of this study, it concluded last year, after consultation with financial officers of the Institute, to cancel the endowment insurance that we have been carrying and toward which you agreed in 1926 to contribute \$8.70 annually. The cash value of this insurance was turned over to Mr. Ford, Treasurer of the Institute, for reinvestment with Institute endowment funds. We have today, as a result of this transfer, an endowment fund totaling \$13,624, earning interest at the very exceptional rate which the Institute is receiving on its investments.

"In the statistics used in estimating what the end results of this transfer would be in 1951, it was necessary to make certain assumptions. One of these was that the loyal members who have paid the \$8.70 since we were graduated would continue to do so, and that other members of the group would join in making this annual contribution. We feel that this new plan is a wise one and that it will enable our Class to match or exceed the funds being raised by other Classes to mature on their 25th anniversaries."

The committee which has studied this problem is composed of the Secretary, Roger Macdonald, John E. McMaster, A. Flint Taylor, John H. Wills, and Eben B. Haskell, chairman. They earnestly bespeak the support of this Fund by every member of the Class who can possibly make an annual contribution. If you did not receive one of the letters, you can send your contribution to Mr. D. L. Rhind, Bursar, M.I.T., and it will be promptly recorded and acknowledged. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M.I.T., Cambridge, Mass.

### 1930

Cupid continues to be our ace reporter, supplying this column with more news than all other sources. Bill Howard, I, was married on March 6 to Miss Virginia Kemler of St. Louis. One week later, Sanny Moss, X, took as his bride Miss Mildred J. Newton of Portsmouth, Va. — The engagement of Mike Fenton, II, to Miss Margery L. Reilly of Dorchester, Mass., was recently announced, and by the time this news reaches you the wedding will have taken place. — Congratulations, gentlemen, from the Class.

Your Secretary saw Chet Turner, XV, recently, and expressed the hope that we would meet on Alumni Day. Chet said the milk-can business was so flourishing that he might have difficulty in attending. — From a recent Course XIII graduate, we learn that Garret Green, XVI, is working in the scientific department of Federal Shipbuilding and Drydock Company in Kearny, N.J. In the same city we find Bill Griffith, VI-A, who is now with Western Electric. — Joe Twinem, I and

XII, is prospecting in Cripple Creek, Colo., and Professor Locke '96 tells me that Joe has formed a partnership with an old-time hard-rock miner. Needless to say, Joe hopes for big things to happen. — Bob Henderson, III, has come east as far as Climax, Colo., where he is working for the Climax Molybdenum Company. — Yuan Kuo, IV, is now a professor of architecture in Canton, China. — Phil Holt, X, has deserted Akron, Ohio, and is now located in Summit, N.J. — Mendall Thomas, I, is engaged in work for the geological survey in Hartford, Conn.

We look forward to a large and enthusiastic gathering of '30 men at the Institute for the third annual Alumni Day on Monday, June 7. The banquet at the Hotel Statler in the evening will conclude a perfect day for all fortunate enough to attend. — PARKER H. STARRATT, *General Secretary*, 75 Fenno Street, Wollaston, Mass.

### 1932

The June notes for The Review should contain the complete and final results of the questionnaires sent to the members of '32, but, as many know well, the bearded gentleman who edits the class notes must have them in his hands by the 24th of April. Hence, although the returns are neither final nor complete, they are interesting even at this early date. In fact, the replies have been so numerous — 159 to date — that your erstwhile statistician, classmate, and reunion chairman [Tom Sears] has hied himself to the woods of New Hampshire, snow and all, for deep thought and contemplation and a bit of statistical endeavor. Those who know something about questionnaires of this sort say that a 10% return is good (ours is better than 15%) and that the results thus obtained may be applied to the group as a whole. All this sounds vaguely reminiscent of that hot summer when we sweltered through MacKinnon's statistics.

Anyway, here are the vital statistics: 1.4% of the Class report a highly polished shiny knob, while 33.6% have reached the thinning-out stage and report 50-50. Sixty-five per cent report that the density of turf on the pate is just as great as ever. Fifty-three per cent of the Class are married, with an average of two-thirds of a child apiece. One reports four kids, several report three, but the majority of our intrepid benedicts report the onetime familiar goose egg. Politically, the Class is pro-Republican, with Hoover leading Roosevelt 77% to 23%, and Landon leading Roosevelt 74% to 26%. But even the Roosevelt adherents forsake the cause, for the Class is 86% against the current program to enlarge the Supreme Court. Sixty-four professors were nominated for the role of favorite, with Rogers, Douglas, Lewis, Tucker, Robinson, the late Eddie Miller, Jack, Emerson, Schell, Greene, and Magoun leading the race.

To this report we must add a few choice tidbits culled from the returns, so haul up a chair my dears: B. M. Markstein, Jr., reports his employment as boss, chief dishwasher, and general flunky. — Tst,

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tst. — Johnny Jewett wants to know how the bachelors are doing on this "daddy" business. — Jim Smith wants us to know that Rockland, Mass., is a town, not a city. (Where is it?) — Professor Bob Butler of Lehigh reports one offspring, and we hear, via the grapevine, that Butler, Jr., too, has Titian turf upon the pate. — Hello, Joe Stowell, M.D. — And we're going to fix it so Ed Rosenquist can get off for the week-end. Hi, Rosey. — And hi to you, Bill Kirkpatrick. Words fail us, but the answer is "just the same" and "O.K." — We saw Dick Hall today for the first time since —. Dick's just the same and doing a nice job for the New Hampshire Diatomite Company. — Harry Johnson has received a fellowship and will return to the Institute next fall. Good luck, Harry.

To Railroad Man Howard Kinzer: "How's this — O.K." — Hello to you, Jim Harper and Henry Smith. — Professor Rogers, please note: One erstwhile '32 man reports that he's acourtin' the boss's daughter an' doin' O.K. — J. L. Thistle was married to Marion Johnson on August 31, 1935, and now has Barbara Thistle, aged four months (if you get your Review on time). — Wonder if Montgomery Ward Chuck Thayer and Sears Roebuck Don Gilman ever have any business squabbles. — Thanks, Dana Price, for your note. — We're having a special class for Box Axford, Tom Rhines, and a few others on how to fold an 8½ by 11 sheet to fit into a 6¾ envelope. — Our "packing" question brought a storm (14%) of protest on our heads. Henry Braun claims it's a leading question like "Do you still beat your wife?" while Rod MacDonald, up in Canada, says he never heard of it. Lucky Rod. Francis Carboine and Harry Johnson just carefully correct us, while Bernie McMorrow, who is sanitary engineer for Maricopa County, Ariz., says: "We Arizonans take our national problems seriously and are not influenced by big-money propaganda." — Hurrah for the kipper kipper snacks.

Perhaps it is in anticipation of the forthcoming reunion, which we have reason to believe will be a most successful and enjoyable occasion, that your Assistant Secretary received from Johnnie Lawrence the letter which is quoted below. The last time Carroll saw Johnnie was in the summer, and prior to that time he had not seen him since graduation. Their meeting last summer was under somewhat unusual circumstances, which may bear description. At the time Carroll was living with Gil Roddy '31 and Jim Fisk '31 at the M.I.T. Graduate House, and had been away for several days. He arrived home one morning, having come up on the midnight train from New York, and the hour of his arrival was somewhat earlier than is the customary rising time on Sunday morning. Somewhat to his surprise, he found someone sleeping in his bed, and behold! it was Johnnie, who came to with somewhat of a start. His letter: "... The other day I received a letter from Guzzie Guziewicz, in which were many interesting tales about our classmates which belong in the class notes

## 1932 Continued

of The Review. He says: 'Eddie McLaughlin, after coming back to civilization from the wilds of Honduras, got mixed up in the oil business and is one of the plant engineers of the Brooklyn refinery of The Standard Oil Company of New York. Eddie, having been in Course XVI and then II, finally getting a degree in General, is now supposed to be a chemical engineer. Some fun, as Ed hardly knows H<sub>2</sub>O from second base, so he got himself a night-school course in qualitative and quantitative at Pratt Institute and claims he knows as much as the professor — so far. The last time I saw him he was buying a ticket for France and planning to go over for a week or two in April.

"Eddie Wright was in Philadelphia," continues Guzzie, "in the office of the General Motors Acceptance Corporation, financing people who wanted to buy cars. Some time last fall he was sent off to Detroit to go to one of the General Motors schools, and then I lost track of him. He is still the great lady killer and enjoys every bit of it. — At the Edward G. Budd Manufacturing Company there are a number of Tech fellows: Frank Chaplin is doing stress work in the stainless-steel train department. Week-ends he goes in for horseback riding in a big way. Joe French is still here, being one of the little corporals, or something, in the train engineering room. Joe was a father for the second time a short while back — a girl whom they named Barbara. His other little kid, Donnie, is about three years old and a cute little son of a gun. Charlie Conwell '31, though not of our Class but known to all Course XVI men, quit his job a couple of months ago and is off on a tour of America and China. We got a card from him yesterday mailed in Tennessee — the lucky guy. Paul Gerhard is still another Budd man. . . . Stan Johnson was at Budd's about a year and is now at the Philadelphia plant of General Electric, having something to do with switch-board engineering. Stan went and got himself a baby last fall and so has to work hard and diligently to get a few kopecks for cradles and such, while the rest of us squander ours foolishly. Johnnie Lyon is one of the chief shop planners here at Budd's. Johnnie, too, has a little baby about a year old.

"Penn Hall is playing around with machine design at Du Pont's in Wilmington, and commutes from Philadelphia every day. Last winter he was doubles figure-skating champion of Philadelphia and liked his partner so well that he decided to marry her. — George Kerisher is right-hand man to one of the vice-presidents of the Crossby Steam Gage and Valve Company. The sad part is that the vice-president has no daughter. Otherwise George is doing right well, having done almost every kind of work in the plant from turning down forgings in the machine shop to holding the customers' hands. On the side he and another chap do a bit of technical tutoring."

"Guzzie writes that he, himself, is still working for Mr. Budd. He is one of eight left from a group of over 50 men who started in the Navy engineering gang.

Thanks a lot for the letter, Guzzie. I'm sure all the rest of '32 will appreciate the news it contained of their classmates. — Dick Hall is working for ex-Governor Winant of New Hampshire and spends his time cruising between Concord, Portsmouth, and Nova Scotia, doing work of a chemical engineering nature. I'm hoping to see him soon. . . .

"As for me, I've been working for Jones and Lamson Machine Company for the past two years and a half, and doing every variety of work connected with the manufacture and sale of machine tools. The latest was to make a sales survey of the Indiana territory. To this end I have been living in Indianapolis for the past six months and now that the survey is completed, I plan to leave for the East shortly. I am hoping to be at the Class reunion in June and shall save the gory details until that time if anyone cares to listen. I sincerely hope to see you all there — at least every member of Course XVI."

— CLARENCE M. CHASE, JR., *General Secretary*, 410 Church Street, Bound Brook, N.J. CARROLL L. WILSON, *Assistant Secretary*, Research Corporation, 137 Newbury Street, Boston, Mass.

## 1933

After four years in the field, the Class seems to be settling down a bit. The address changes are not so numerous as they have been. A good sign, I call it, because everyone I hear from is doing very nicely. A clipping in the Boston *Herald* recently announced the addition of William D. Harper, Jr., to the staff of the United States Diesel Engineering School. — A note from Bob Forbes changes his address from Denison, Texas, to Knoxville, Tenn. He says: "I have just accepted a position as junior civil engineer in the special assignments and reports section of the engineering data division of the TVA."

The society columns again have some news for us: The marriage of Asa Jewell to Miss Margaret Loring took place on April 15. The engagement of Don Winters to Miss Phyllis Brown and that of Bill Murphy to Miss Geraldine Joan Murdock have been announced. Bill is stationed at Fort Du Pont, Delaware. Our best wishes to all of you.

During a recent trip to Pennsylvania, yours truly dropped in on Otto Putnam and George Garcelon at the Althouse Chemical Company in Reading. Both Otto and George are doing very nicely, Otto being plant foreman and George in the research department. The company manufactures dyestuffs.

A son, Phillip Barclay Brockelman, was born to Mr. and Mrs. Anton H. Brockelman of Bancroft Tower Road, Worcester, Mass., on April 23 at Worcester Memorial Hospital. — GEORGE O. HENNING, JR., *General Secretary*, 330 Belmont Avenue, Brooklyn, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-107, M.I.T. Cambridge, Mass.

## 1934

Tonight I am sitting in the kitchen of a peaceful Connecticut farmhouse, dictating class notes by the light of an oil lamp.

In order to compensate for this reversion to the rustic, I have with me a beautiful 1937-model brunette secretary. Sounds like a scandal, but it isn't. She is Mrs. W. G. B., Jr. As a sure cure for spring fever, there is nothing like a three- or four-day rest in the country. As a fisherman down here, I am a good polo player. In a brook which has been stocked with 2,000 nine-inch trout, I couldn't even get a nibble in two hours. Laughing at my wife trying to put worms on a hook was more fun than fishing anyway. Being hard-boiled with women when fishing is a necessity.

If you will refer to your April copy of The Review, you will find reference to a plan where in 1934 men in each of the larger cities are asked to contact each other at least once a month if possible. At this meeting, one of the number is to be informal secretary of the month and to forward to the Class Secretary a short résumé of what those at the meeting are doing with reference to the four w's (who, what, when, where). Thus we can keep some valuable contacts very much alive and, at the same time, make this column of interest to all of us. As to the second portion of this plan, the appointment of Course Secretaries, I openly call at this point for volunteers. Those Courses which lack the initiative to have themselves represented are, in my opinion extremely shortsighted. Without such coöperative measures with the Class Secretary, 1934 will be poorly represented in The Review and, what is more serious, we will be sacrificing as a group the opportunity to enjoy the benefits of mutual business and social contacts which we might overlook had they not been called to our attention in The Review.

I regret to say that due to lack of space in the class-note section last month, it was necessary to postpone certain portions of Charlie Barrett's letter. Charlie continues: "Not so long ago I met Al Loring, who is working for the Johns-Manville Corporation in Somerville, N.J. Al, Art Esslinger, and I went on an exploration tour to Jimmy Kelly's in Greenwich Village for Art's benefit. Afterward we migrated to the German-American Athletic Club, apparently a Tech rendezvous, where we met Fred Judd, VIII, who was putting on a big party there. Jim Sweeney, XIII, is working with the St. George Shipbuilding Corporation after receiving his master's degree at Tech and instructing for a while there. Charlie Partridge is with the Vermont Marble Company at Proctor, Vt."

Cassius C. Belden, XV, sent me a fine letter from Los Angeles, in which he states that he has been enjoying the unusual weather and goes to some length to explain why it is unusual. He says: "We have been having unusual weather ever since we arrived, so much so that I am beginning to wonder if they ever have anything else. The word 'unusual' is the most overworked word out here. If it rains on Thursday or gets cold on Tuesday, everyone says: 'My, this is certainly unusual weather we are having for this time of year; I have never seen it like this



1934 Continued

before." In spite of all the unusual weather, it is still a swell place to live." — Cash is in personnel work with the Union Oil Company of California. He writes that he had a card from Hal McKeever, II, who is doing right well by himself on a sugar plantation in the Philippines. For those who wish to write to Hal, his address is Silay-Hawaiian Central, Silay, Occ. Negros, Philippine Islands.

Crossing the continent with a mighty leap we hear from Ernest A. Massa, Jr., VIII, otherwise known as Freddy. He is making rapid strides in advanced television research for the Radio Corporation of America under Dr. Zworsky. Prior to taking on television Fred worked on the electron multiplier, and it is as a part of his television work that he is attempting to develop a good transparent photocathode, *i.e.*, one that will give off electrons from the opposite side on which light falls. He has written several technical reports, one of which, "Electron Paths Made Visible," was delivered before the joint physics colloquium at the University of Pennsylvania. He is still single.

Hoyt Steele notified me that Dave Ingalls suffered a severe head injury. While riding, as is his custom every Saturday morning, he was unaccountably thrown, fracturing his skull. After a confinement of several weeks at the Overlook Hospital in Summit, N. J., he will take a short sea cruise before returning to his job as chief engineer at the Titeflex Metal Hose Company in Newark, N. J.

This month will probably bring a big crop of weddings, all of which I hope you fellows will report to me in detail. Phil Kron, our erstwhile and esteemed treasurer, was married on April 17 to Miss Eleanor Ruby Hill, daughter of Mr. and Mrs. William J. Hill, at the Munro Avenue Methodist Episcopal Church in Rochester, N.Y. I wonder how long it will be after graduation before we will have an equal number of married and unmarried men. — Mr. and Mrs. Alexander M. Robbins of Magazine Street, Cambridge, have announced the engagement of their daughter, Miss Bernice Robbins, to Mr. Arthur Leonard Conn., X, son of Mr. and Mrs. Nathan A. Conn of Washington, D. C. Miss Robbins is a graduate of Simmons College and is now attending the Smith College School of Social Work. — In New York, Mr. and Mrs. Louis A. Voltter of 1 West 81st Street, have announced the engagement of their daughter, Miss Ruth Doris Voltter, to Marvin J. Silberman, son of Mr. and Mrs. Alfred M. Silberman of Hartford, Conn. The prospective bride attended the Adelphi Academy and Skidmore College.

I believe it would be a good idea if, when any one of us needs advice, a contact, a source of supply, a potential sales outlet, or any such assistance, that he write to one of the fellows working for a company engaged in the line of work in which his problem lies. The advantage of such a system is twofold: First, the fellow seeking advice or an entree to a plant will have someone within the plant to contact the proper parties and thus in-

sure that the question will be fairly handled. Secondly, the fellow who is contacted can help his own prestige by being able to bring new business or contacts to his concern. To assist the idea along, I am establishing a small cross-index file. The only way that your name and your company can be represented in this file is for you to write the Class Secretary a letter, describing what you are doing and for whom. In this way I hope to be able to have the information should you sometime wish to contact a certain field of work or company. Any suggestions which you fellows may have for improving this column or enhancing its usefulness will be very welcome. — WILLIAM G. BALL, JR., *General Secretary*, 18 Ware Street, Cambridge, Mass. ROBERT C. BECKER, *Assistant Secretary*, South American Development Company, Apartado 655, Guayaquil, Ecuador, South America.

## 1935

By the time this is published many of us will be traveling from many directions to attend Alumni Day, June 7. Here's hoping there will be a substantial number of the Class present. Don't forget that we are to meet informally in Walker, West Lounge, following the conference on housing.

There is a bit of news to relate this time, beginning with the usual crop of marriages. Mary Ann Hendrickson and Luke Packard were married on February 26. Luke is working for General Radio Company in Cambridge, Mass. — Elizabeth Peirson and Ed Heizer said, "I do," on April 9. — Frances E. Rabinovitz and Charlie Ross will walk the center aisle in the near future. Charlie is working for Imperial Paper and Color Corporation in Glens Falls, N.Y., as a research chemist. — Edith Shirley Brandow and Dick Guenther are engaged. — The previously announced engagement of Polly Paine and Wes Loomis culminated in their wedding on April 17. To the best of my knowledge Wes is working for Automatic Electric Company in Kansas City, Mo. — Beatrice Child and Art Gilbert are engaged, but the wedding date has not been set. Art is finishing his second year at the Harvard Business School and will be graduated this month with an M.B.A. I have not been able to uncover his plans for work following graduation. Perhaps he is planning to live on love and a dime. Hope you guys and gals have "knee action" to smooth out the bumps.

Two other members of the Class are also beating the books at Harvard Business School: Jack Burton and Ed Beckwith expect to receive their M.B.A.'s this month. Neither would break down and let me in on the secrets of his prospects for employment as a captain of industry. — About a month ago I dropped in to see Tony Dauphiné at the Tech Graduate House. Tony has been instructing the budding chemical engineers for the past year and has been slipping in a little study for his doctorate. All he lacks now are the language requirements and a thesis. He plans to do the latter this summer and the next. In the meantime he keeps

life interesting by sailing the dinghies on the Basin. A few tidbits picked up during the conversation indicate that Johnny Demo is now the assistant to his boss in the Tidewater Oil Company. Rumor has it that Johnny will marry this summer. — Rumor also suggests that Oscar Wiedeman will marry soon. — Johnny Bainbridge is still with Merrimac Chemical in Everett, Mass. — Bill Rothen drove up to Boston about a month ago in a new V-8. Looks as if prosperous times are here again.

Orchids for Art Haskins. Art sent out some letters to his coursemates and sent along the letters he received in return. One of the letters was from Clyde Leavitt: "On glancing at the above address (Beaumont, Texas), you might think that I had turned cattleman or something. I drove down here about New Year's and am with Pennsylvania Shipyards, Inc. The drafting force is small — half a dozen men or so — hence the work is varied and interesting. The biggest job that they have now is a 258-foot tanker for service on the Lakes and New York State Barge Canal. Besides the tanker there are a few towboats, barges, and what not under construction. The only thing that I do not particularly like is that we work a 48-hour week which means all day Saturday. I had rather hoped to find some sailing down here, but there seems to be little or none, either on the river at Beaumont or on the Gulf. (We are located about 50 miles from the Gulf of Mexico on the river Neches. . . .) We started to go up the Neches last week-end in a powerboat which was not in absolutely A-1 condition. As we were approaching a railway bridge, the rudder fell off and sank without our immediately becoming aware of the mishap. Just before we hit the center pier (pretty good marksmanship without a rudder), we decided that she did not answer the helm properly and we stopped the engine. Unfortunately the engine was not in any condition to be reversed, so we hit with quite a good impact but did not start anything. Eventually we were towed ashore and made a steering sweep that took us home all right."

The next letter Art sent along is from George Morrisette: "On January 2, this year, I did the same as you did last year (meaning Art) — married a girl from the home town. And now this is the home town (Jersey City). Her name is (or was) Dorothy Middleton. We have an apartment here in Jersey City. The only trouble is that we are too far from the country and fresh air. I'm still in the engine estimating department for Federal Shipbuilding and Drydock Company at 25 Broadway, New York, but we are going to move somewhere else soon — to another building in downtown New York. Reggie Iodice is now in the hull-drafting department and Herb Francis is in the production department at Federal. I saw Hart Livingston the other day. He had been in the engine department at Sun Shipbuilding in Chester, Pa., but left. He is now second assistant engineer on one of the Pan-American tankers. Every now and



1935 Continued

than a bunch of XIII and XIII-C men get together at the Technology Club in New York."

Another of the letters was from Whit Stueck, who is living in Great Neck, N.Y.: "Yes, I know my own mind all right, but I can't argue with Owen and Burtner about the yacht business. My only argument is that it's a lot of fun and I can't seem to get into anything else with any degree of enthusiasm. My work here with Cox and Stevens (Phil Rhodes) is grand experience and I'm learning a lot, but experience so far has failed to satisfy my appetite. In spite of this, I still feel there is a good living in the business somewhere, and I am still on my way to finding it. . . . I saw Westfall the other day. I was at the Delt house for initiation. He woke me up at 4 A.M. (I had been in bed since 2:30) and we had a bull session until 6:30. Then he (so groggy he could hardly see) pulled out for home. I hope he got there alive. I went to bed. All my spare time in the summer is occupied with sailing and I spend the winter getting ready for the next summer — and talking about the last. I sailed *Altair*, Star boat No. 3, last summer, and we won our way to the internationals. There we had varied luck and placed from seventh to 26th, finally finishing 15th in the point scoring. That was not too bad out of 35 boats picked from fleets all over the world. With a little more experience, we ought to do better next year. I have not found my sweet (or otherwise) young thing who will have me around. They don't seem to mind my taking them to see the sights of the big city, but that's as far as it goes. Which is . . . lucky for them, because if I married on what I make, she'd have to go without stockings. I've cultivated a swell blonde or six though, and it's going to be tougher staying single from now on." Let us know when one of those blondes gets the best of you, Whit.

The last letter Art forwarded is from Charley Hanley: "I am still at Gibbs and Cox — long hull arrangements and fittings. There are quite a few XIII and XIII-C men around New York, and we have been getting together about every three weeks for the past few months. Hugh MacDonald '33 is sort of chairman and arranges the gatherings, which are held at the Technology Club. Those of our ilk who have dropped in to meetings are George Morrisette, Reggie Iodice, Whit Stueck, Clyde Leavitt, and Don Wood. The latter, after a year on the docks, graduated into an office job with Eastern Steamship Company. Will Grosser is working for Federal. . . . The last I heard of Eastburn he was, for the time, at liberty. He had been working as a ship fitter at Sun Shipbuilding Company in Chester, Pa., but decided he had had enough. . . . At last report, Simonds was working for an oil company in Philadelphia."

We'll wind up this news about the tugboat boys with Art's letter: ". . . As for myself, I'm up to my neck in propellers. We're balancing dynamically some destroyer wheels for Hyde Windlass. They

are to be used on the U.S.S. *Dunlop* being built at United Drydocks. In my spare time I'm drawing a wheel for a couple of new fishing trawlers that we are about to build for the F. J. O'Hara, a fishing company of Boston. This work is very interesting besides giving me a variety of working conditions. The balancing is done in the machine shops and the rest in the engine drawing room." — Many thanks, Art, for the very interesting and voluminous news for this month. If a few more of our hard-working ( ) Course Secretaries follow suit, we'll have a swell column each month.

Charley Smith did his bit for the chemical engineers this month. Here is his contribution: "Dick Smith has left his Boston job to work in Montreal with the Canadian Industries, Ltd., of that city. Big Dick is now back, breaking the hearts of the belles in the French-Canadian quarter of the city. — From Johnny Demo, still down at Bayonne, N. J., I hear that at the Newark gathering of Alumni recently, the Class representation included Joe Haggerty, Fiske King, Bill Abramowitz, Johnny Greze, and Charlie Piper. Johnny's information about them I pass on to you. Johnny Greze is in the biological end of the game at the Zonite Products Corporation in New Brunswick, N. J.; Fiske is now with Groton and Knight Company; Charlie Piper is a Western Electric man; and Bill Abramowitz draws his pay from National Oil Products Company. Joe Haggerty is living at Roselle, N. J., and working for the American Cyanamid Company. Jim Wiedeman works for the same company at its Stamford, Conn., plant, according to Joe, through Demo's letter. . . . From Demo, also, comes news that Cornelius Wilson is among the New York Alumni doing design work for Grissom and Russell Company. . . . At an Alumni meeting in Buffalo last November, who should turn up but What Duff. John is working for General Chemical in this city. Reid Ewing is still going strong with Linde Air Products here. Reid would like to find the guy who was responsible for the dearth of snow, and consequent cramp in his skiing plans, this past winter."

Our last letter this time is from Ed Gelus who, at the time of writing, was in Houston, Texas. Here is Ed's report for the year: "On the first of September, I gave up my instrument job with Sinclair Oil to take a chemical job with Shell. My official title is junior research chemist, which is very misleading for it gives little clue as to the nature of the work. Most of the work deals with the operation of a pilot cracking unit for the purpose of studying the cracking characteristics of crudes and residues. The job covers many fields of endeavor, including floor sweeping, pipe fitting, coke removal, insulating, pump servicing, and so on ad infinitum. When not engaged in cracking operations we work on fine fractionation of gasoline cuts and mercaptans, extraction of aromatics with sulphur dioxide, and the study of column efficiencies. Although the work is somewhat routine in character, it is quite in-

teresting and instructive. By the way, one of the department heads, Ivan Cliff, took his Ph.D. at the Institute in 1933. The only somewhat undesirable feature about the work is that it is a shift affair. The experimental work goes on 24 hours a day, necessitating weekly shift changes. With the exception of the graveyard shift, they are not too bad. Even the graveyard shift is tolerable if one manages to keep busy. One of the fine features of the job is the four-and-a-half day rest period following the graveyard shift. Most of my leisure time I spend fiddling. Since leaving Tech I've taken up the study of the violin rather seriously, practicing as much as four hours daily (this may account for the frequent changes of address). Houston is more than just an oil town: During the past several years it has become culture conscious and now boasts a symphony orchestra. As a result, my hobby has become more than just a source of annoyance to the neighbors, for I have a contract with the orchestra for the 1937-1938 season. I don't think the Boston Symphony has to worry about competition from this source — at least not for the present.

"At an alumni meeting held last December in honor of Dean Lobdell '17, I met Warren Sundstrom. He is working for Humble Oil at Baytown in the technological department. A month or so ago I ran into Jack Flaitz engaged in a race against time. Since he had only a few minutes left in which to cover the five blocks separating him from the United Gas headquarters, we did not talk very much. I understand Jack is doing very well in the engineering department of the United Gas system. If my plans work out, I'll spend two weeks in Massachusetts next November. After seeing nothing for two years but flat cow pastures stretching to the horizon, a glimpse of New England's rolling terrain will be most welcome."

The last bit of news which came in during the month is a copy of a note Leo Dee sent to the Register of Former Students. Leo has been employed since last September as test and development engineer by Standard Air Conditioning, Inc., of New Rochelle, N. Y., a subsidiary of American Radiator. Previously, Leo was with Fairbanks, Morse and Company in New York City. His home is in Ossining, N. Y.

As for me, by the time Alumni Day rolls around I hope to have passed the finals of my first term at Harvard Business School. I'll be here through most of the summer, taking second-term work. For amusement, I've been spending most of my spare time rowing on the river.

Before long I hope to find the time to pass the tests required to use the dinghies at Tech. Thereafter Sundays will probably find me hoping for sun and wind on the Basin. See some of you on June 7. — ROBERT J. GRANBERG, *General Secretary*, Hamilton D-32, Soldiers Field, Boston, Mass. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.

*Plan to attend Alumni Day at M.I.T. on June 7*

## 1936

Always having a few engagements and marriages to announce, I like to give out the glad tidings first. Here goes: On Saturday, May 8, we find that Edgar C. Rust, Jr., married the former Miss Charlotte R. Williams of Richmond, Va. Following a church wedding at 8 o'clock in the evening, the reception was held at the home of the bride's mother. The couple are now residing in Clifton, N. J. — On March 20, the engagement of S. Norton Miner to Miss Isabel Keller of Brookline was announced. Miner is working with Perry M. Duncan, New York City architect. — Richard U. Bryant is now engaged to Miss Elizabeth Bramhall. Bryant is connected with the Firestone Tire and Rubber Company in Akron, Ohio. — Another Akronite is Bernard S. Schulman, who will be married this month to Miss Helen Salkin of New Rochelle, N.Y. They will reside in Akron. — For the finale, I received an announcement of the marriage on April 10 of Miss Katherine Bosworth Niles to Franklin P. Parker. Our best wishes to all these newlyweds and those about to be.

*Course V.* A letter from Bob Sherman is obviously artificial since he is living close at hand in the M.I.T. Graduate House. However, it seems to be the best medium to transmit the news he has gathered as Course Secretary. He says: All of us are managing well here at Tech at the same old grind. Spring is taking its toll. Freddie Carten seems to be noticing it most; in fact his hair is literally becoming definitely gray in spots. It seems that two weeks ago in his organic lecture, Professor Ashdown '24 wished to demonstrate the aniline acetate test for furfural, in which a piece of test paper, on suitable treatment, is supposed to turn red. Imagine the professor's embarrassment when it turned a brilliant green. (Freddie later admitted that the paper must have been old and contaminated.) Then for an experiment in Professor Huntress' ('20) dye course, Freddie came through with a zero per cent solution of Grignard reagent. But then with spring, and Jessie, he can't really be blamed. And he is already ambitiously at work on the preliminary tests for his thesis on the action of ammonia and alkali metal amide on double bonds.

I note that I omitted mentioning that Don Thompson was in town in February with Willie Anslow, Harry Donaldson, and a labmate, Bill Adams, from London, who is working with him on rubber latex. I gathered from them that they were fast becoming acquainted with New York. They had just previously been to see Alice Hunter Kimball, who had entertained them royally. Willie is working under Dr. Bergman of the Rocke-

feller Institute on the synthesis of polypeptides — a difficult field. Also, perhaps some of you noticed Willie's thesis in the March issue of the *Journal* of the American Chemical Society on the "Photochemical Addition of Hydrogen Peroxide to the Double Bond." It is being rumored that Willie, as a representative for yours truly in the New York area, will report as soon as he gets a new pen. If one of you fellows down there would loan him one, I should appreciate it. Willie says that he sees Don Thompson and Harry Donaldson frequently. For Don he predicts a successful career in business. We all believe he is right. Harry Donaldson at the Nuodex Products Company in Elizabeth, N. J., finds that analyzing paint driers for iron, cobalt, nickel, manganese, and so on, doesn't require all of his time; in fact in New York, under Willie's skillful tutelage he is learning to like oysters. (I hope he means just oysters!)

Henry Herpers, whose silence remains unbroken, is, I learned from Freddie, now working at Du Pont's in Newark on routine paint analysis. The story runs that he plans to come back to the Institute next September for graduate study in geology. — Art Sedoff, so I hear, is tiring of school and hopes definitely to enter industry next summer. Best luck, Art, and incidentally, congratulations: I understand that Professor Hockett delivered a paper at the recent Chapel Hill, N. C., meeting of the American Chemical Society, including your thesis on 1-threose. — Louis Stahl dropped in at Tech a couple of weeks ago. He is still with the Stahl Finish Company, but since they have acquired a new salesman, he doesn't chase around the country the way he used to, but he is keeping busy in the lab. — So to the end of the list with a comment on Barney Vonnegut's effective new method of pipe cleaning, which is really quite tricky. He has been considering a patent.

*Course VI-C.* Jack Cook transmits a pleasant surprise in the form of a letter from Henry Wilsey, just back from five months aboard a freighter and in Egypt and India: "Egypt has always called me, but I remained unimpressed by the pyramids. . . . Aden gave me the bum's rush when I missed the ship after trying some of their polluted beer. . . . Eastern beer is invariably doped with quinine to preserve it from the heat. Bombay and Calcutta both had an excellent assortment of American movies and American products. . . . Our cargo included everything from Puffed Wheat to airplanes and tractors. One could manage very well by speaking English in India, but a super-knowledge of finance would be necessary for a protracted stay, as the natives seem to be a cross between a slip stitch and an adding machine. The two high spots of

the trip were quite opposite in nature . . . a week-end in Agra viewing the Taj Mahal . . . and the shipload of 650 monkeys we brought back to New York. The monkeys were far from amusing after the first few hours . . . in fact, for several weeks we stank of monkeys and cursed them by the hour. . . ." — Jack adds that while visiting some friends in Springfield, Vt., the early part of April, he met Bob Gillette, II, who is working as design engineer for Jones and Lamson. There was something else about Bob taking out the boss's secretary for dinner (following Tubby Rogers' advice), but I don't believe it.

Two letters are not much of a mailbag. It appears that my former correspondents are becoming tired of writing, and I don't blame them. At any rate, in the absence of news I managed to find a little bit of information. First, Charlie Betts was in Cambridge a short time back. He is still working on specifications for Johns-Manville. — Ben Sharp '34 has also been around Technology recently because he is working in near-by Lynn on production work for the General Electric Company. He says that his brother, Johnny, has a good job researching on glass for a well-known manufacturer, but the name of the company has slipped my absent mind. — No relation, but a namesake of the foregoing, Larry Sharpe, is now in Chicago but still with the General Electric X-ray Corporation. — Russ Miller is with the Atlantic Mutual Insurance Company, New York City. — Jim Craig is in Newark, N. J., with the Linde Air Products Company. — Louis Wetmore is at the Cranbrook Academy of Art, Bloomfield Hills, Mich. — The United States Geological Survey has secured the services of Douglas Woodward, who is located in Albany, N.Y.

And that reminds me of another biologist, Ed Pratt. I had supper with him at the Café not so long ago only to learn that he had no news but was still working at Harvard Medical School. — Wilfred Post is now connected with the Lehigh Aircraft Company, Allentown-Bethlehem Airport, Allentown, Pa. — Gibbs and Cox of New York City have Bob Johnson on their staff. — Fred Hinton's address is now care of Arthur Anderson Company, New York City. — Another of those going into the airplane business is Paul Mulkern, who is at Newark Airport with American Airlines. — Finally, at Phillipsburg, N. J., we find Paul Morgan working for the Ingersoll-Rand Company.

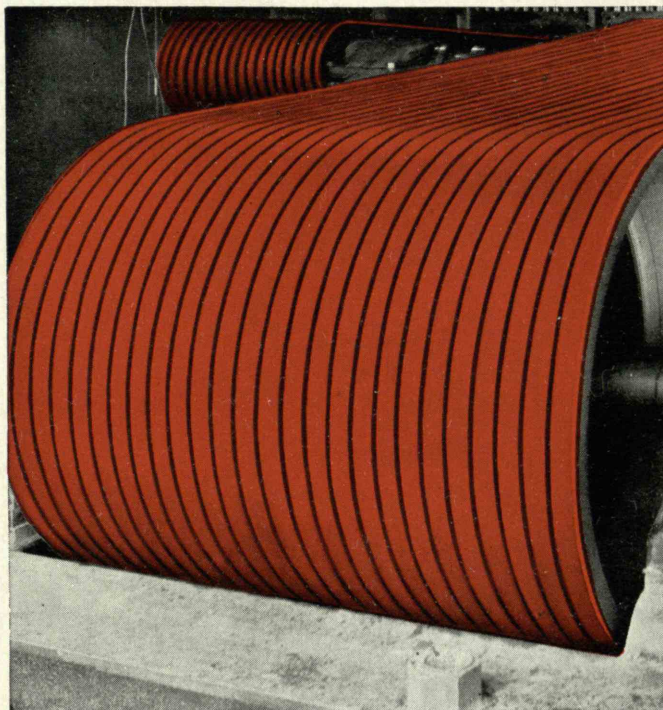
Being now completely wrung out of news, I'll try to soak up some more interesting material for those who will be on hand for Alumni Day at Technology on June 7. See you soon! — ANTON E. HITTLE, *General Secretary*, 23 Sewall Street, Melrose, Mass.

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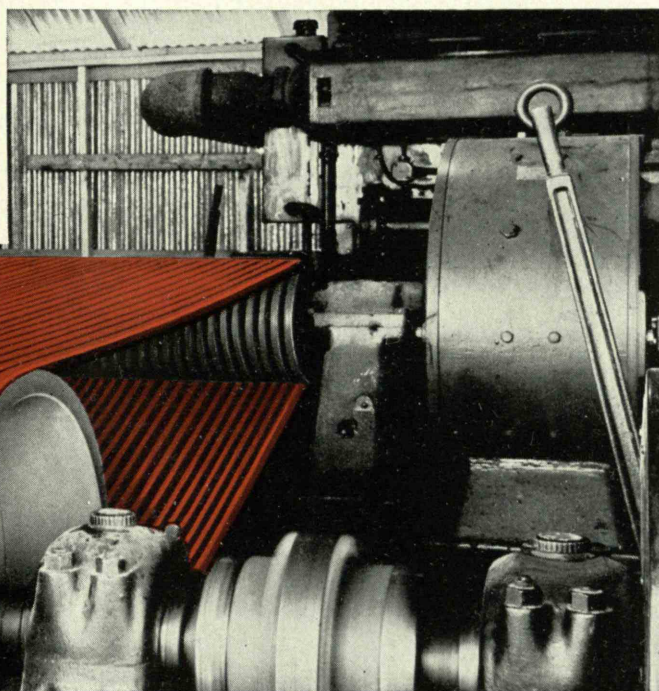


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